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Editorial

Time, The Arbiter 62

Technical Articles

New Surface Treatment for Aluminum	64
Coated Electrode Developed for Automatic Welding	67
Modern Material Handling Ideas for Cutting Costs	68
Drilling Closely Spaced Multiple Holes	71
Effect of Particle Size on Iron Powder Properties	72
Seam Welding Stainless Steel Foil	76
Mechanical Pouring Unit Handles 11 Tons per Hour	77
Industrial Truck Handles 30-Ton Load	80
Strengthening Metal Parts by Shot Peening (Part II)	81
Swedish High Frequency Furnace for Cast Iron	86
Fuel Studied With High Speed Camera	86
New Equipment	87

Features

Newsfront	63
Assembly Line	92
Washington	96
West Coast	100
European Letter	104
Personals and Obituaries	108
Dear Editor	112
Industrial News Summary	114
News of Industry	117
Gallup Polls	121
London Economist	125

News and Markets

Industrial Briefs	128
New Construction	129
Machine Tool Development	130
Nonferrous Market News and Prices	132-3
Iron and Steel Scrap News and Prices	134-5
Comparison of Prices by Week and Year	136
Finished and Semifinished Steel Prices	138
Alloy Steel Prices	139
Fabricated Steel Production Prices	140
Warehouse Steel and Pig Iron prices	141
Ferroalloy Prices	142
Italian-Austrian Steel Agreement	144
Steel Window Program Lags	146
Peacetime Applications of Nickel and Alloys	148
Hot Stretch-Reducing at Lorain	155
Czech Metalworking Industries Suffer Losses	159
Transfer of British Coal Mines Due	161
WAA Property Disposal Administrator Resigns	162

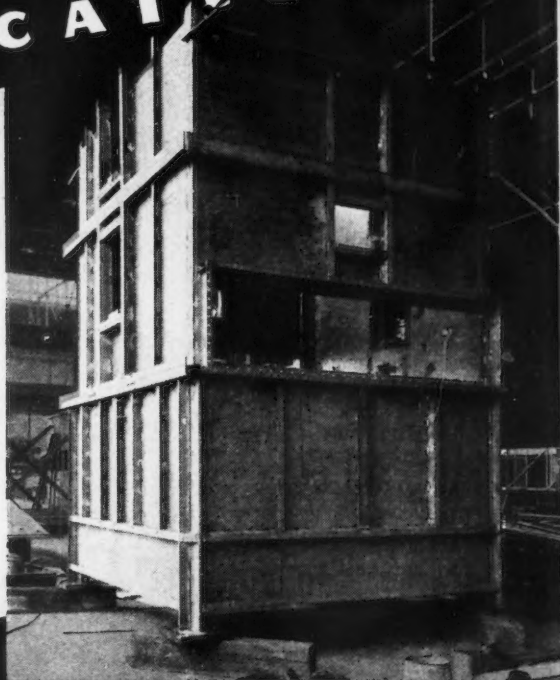
Index to Advertisers 243-44

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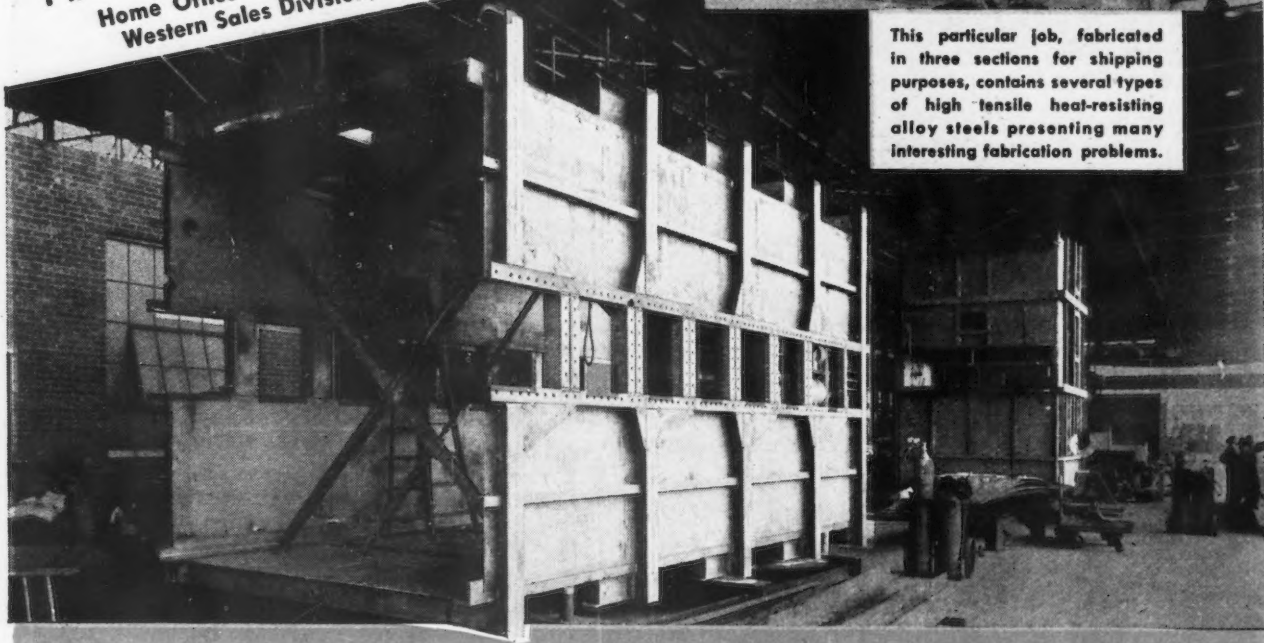
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Time, The Arbiter

IN its short life-span, the Truman administration has rushed into many a situation breathing fire and confidence, and with battle flags whipping in the breeze, only to end up in the corner pretty well off balance, and looking a little frustrated. It's an ability almost akin to genius. While there is a certain amount of understandable exhilaration in ranging John Lewis at the bar, it's beginning to look like

"The charge is prepar'd, the lawyers are met,
The judges all ranged — a terrible show!"

Lewis has been in a weaker strategic position than is his usual wont. His miners, who scratch in the earth's bowels, are usually pitted against an impersonal management—a rich opportunity for heart-jerking polemics. But there are few emotional facets to struggling with the Government on subtleties and technicalities of a law—imponderables that are going to look awfully confused after the lawyers beat it around. Realistically, however, he has chosen his ground with all his customary skill—the coal stays in the ground, industrial profits melt away, the people shiver. And as the first blizzard sweeps around the corner, pressure for compromise will grow and current enthusiasm for a showdown will be chilled. Injunctions and courts long ago ceased to intimidate labor leaders. Lewis would hardly care to end his career on the downbeat without a spectacular struggle and time is all on his side. A practical means for getting coal moving will have to be devised long before a lawsuit can beat its way up through the judicial system. Of course, it all could have been an ultra-clever political stratagem to panic a new Republican Congress into session for punitive labor legislation. That could prove more embarrassing than expedient for moving coal. However, the mind reels with the necessity for crediting the Truman administration with that much deliberate political machiavellism.

So, it looks as if a third party, the National Coal Association, may be privileged to rake the chestnuts out of the fire. They're getting pretty experienced in that role. Over in their headquarters in the Southern building, traffic has been pretty heavy these past few days, and something seems to be shaping up, although it may take a little time to smooth out the rough spots. The Government probably can fuss around with its "lawing"; Krug should be able to devise some means of giving the mines back to the owners; and after the usual formal display of huff Lewis might contrive to see his way clear to negotiate in the usual Lewis manner.

The coal will move again. Oh, yes! Naturally the coal operators and the public will be a long time paying the bill!

And what's more important, Congress will soon have its opportunity to act—not in haste, but with deliberate intent to institute statutory amendments to better protect the public interest.

T. W. Lippert

A word about steel claims



FOR more than fifty years Inland has been recognized as a leading manufacturer of uniformly high quality steel. But, at times, chemical analysis or method of manufacture does not always result in a product that can easily be formed or fabricated by *every* type of equipment. Occasionally human errors occur in the ordering as well as the production and fabrication of steel.

We recognize, in these situations, one of Inland's best opportunities to give practical metallurgical and engineering aid. So we urge you always to let us know whenever you might have the slightest difficulty in using any Inland product. Sometimes a different steel is required. Usually a slight change in forming or fabricating method may do the trick. But no matter what the cause or result may be, or whose steel is involved, in the Inland area, we are always ready to help you solve the problem to your complete satisfaction.

This policy of complete customer satisfaction has been in effect for many years. It must be right because it continues to make more and more friends and satisfied customers . . . people who "like to do business with Inland."

Today, as you know, the great demand for steel exceeds production so we cannot supply all the steel needed by our customers. However, we are bending every effort in the development of new facilities to increase production output . . . so that, for your future needs, Inland will be an even better source of quality steel. *You, too, can help the Steel Shortage! Scrap is needed to make new steel. Please see that yours is returned promptly to the mills.*

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INLAND STEEL

➤ It is reported that General Motors may place firm orders early in January for the tooling required for the new Chevrolet light car on which work was recently held up. Present indications are that the new orders will call for delivery of the equipment in August and September.

➤ Some labor leaders are privately wondering whether too much use of the strike weapon may not be a little dangerous in the face of rising public opinion and an incoming Congress which will undoubtedly be called on to consider anti-strike legislation. The problem is can they get this thought down to the rank and file.

➤ Engineering development of methods and equipment to permit high speed airliners to land on and take off from moving railway cars at air terminals was proposed before the SAE air transport engineering meeting in Chicago this week. The group also heard a proposal to build flying ground equipment into aircraft to eliminate ramp congestion at airports.

➤ Tooling costs on 1948 cars are expected to be at least 50 to 60 pct above levels prevailing at the end of the war and somewhere in the neighborhood of 150 pct above prewar cost figures.

➤ Most of the publicity and sales pressure has been taken off gas-fired home heaters in the built up sections of the East. Further installations on a large scale would exceed the capacity of existing mains and threaten explosions. It is expected that gas companies will undertake huge expansion programs when pipe supply eases.

➤ Improved standards of safety, speed and comfort have been set up in the American Brake Shoe foundry with a centralized mechanical pouring arrangement that pours 370 brake shoe molds per hr. One man operates six ladles by push button control, replacing five or six pourers used in the former setup.

➤ A new chemical surface treatment which forms a tight skin-like coating on aluminum is reported to insulate unpainted aluminum even in an active corrosive environment. The new process does not require electricity to apply.

➤ Use of a booster drive on material handling conveyor chains not only eliminates the need for conveyor terminal sprocket wheels but also is reported to materially increase the life of conveyor chains.

➤ Guided projectiles for the experimental rocket testing range in central Australia will probably be manufactured in that country. Flights will start at a few hundred miles and be gradually expanded to 3000 miles. Observation posts fitted with radar will be established along the line of flight on a range which will probably be 1200 miles long at present.

➤ Three detonations, each of 500,000 lb of explosives, proved to the Army-Navy Explosive Safety Board that the amount of explosive stored in semi-underground magazines could be doubled and the distance between magazines halved. The Industrial Preparedness Bulletin of the Army Ordnance Assn. maintains that millions of dollars could have been saved if the board had been allowed to make the tests in 1942, but it was put off on the ground that labor and materials required to make them were more necessary elsewhere.

➤ Manganese deposits in the Brazilian territory of Amapa have been taken over by the Brazilian Government which will survey them to find the best means of developing them. Development may be through private companies or through a mixed government and private project.

➤ The extent of the economy program now under way at Ford may be gaged from the fact that a U-channel of the wheels is being shaped into a modified V, resulting in a saving of a few cents worth of steel. Every part of Ford's cars and trucks will undergo similar scrutiny.

➤ Anyone who desires to get away from it all can now purchase surplus rocket launchers from WAA in four distinct types. Built for installation under the wings of military aircraft, the agency says the rocket launchers are commercially usable in their present form and may be converted for use as warp beams or spools for the textile and rubber industries, fluid conduits for chemicals, water pipe, display fixtures or toys. The materials in the tubes are plastic, steel or magnesium alloy with weights running from 80 to 2000 lb.

New Surface Treatment For Aluminum

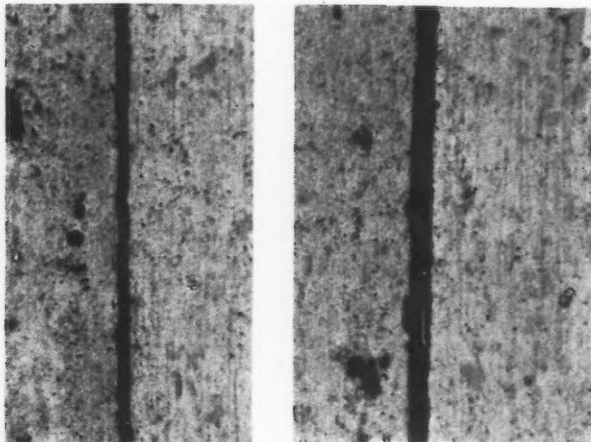
By J. ANTHONY
Eastern Regional Editor

A new chemical rustproofing treatment for aluminum which is said to provide a uniform and highly integrated coating at low cost and with comparatively short immersion time, is described in this article. Equipment and procedure for applying the coating are discussed in detail.

A NEW chemical surface treatment which forms on the aluminum a tight, skin-like coating which will insulate unpainted aluminum against even the most active corrosive environment has been announced by American Chemical Paint Co., Ambler, Pa. This new coating, which requires no electric current to apply, is said to grip the organic finish on painted or waxed aluminum with more than ordinary tenacity to protect both metal and finish over long periods of time.

This new process, called Alodizing, is expected to provide the aluminum industry with a rustproof coating of unusual quality at exceptionally low cost. The uniformity and integration of the coating produced by Alodine,¹ which give it a high corrosion resistance

FIG. 1—Uniformity and integration of the Alodine coating are illustrated in these two micrographs. Specimen to the left was Alodized by method No. 1 (fig. 3) while specimen on right was treated by method No. 2. In both cases the zinc surface is to the left in micrograph.



value, are shown in fig. 1. The series of test panels shown in fig. 2 illustrates the relative values of various preparatory treatments for aluminum. These

¹Registered trademark of American Chemical Paint Co.

panels were prepared for painting as indicated in the caption, then primed with zinc chromate and the lower half covered with one top coat of paint. Following this treatment they were exposed to the highly corrosive effects of salt spray and humidity and then photographed. These panels indicate the high quality of the bond which Alodine under paint provides.

Despite the high effectiveness of the Alodizing process, it is extremely simple to use. Clean aluminum is merely immersed in the Alodine bath, then dried with heat. If the surface is to be painted, the work is rinsed after coating, first in clear water, then in an acidulated rinse. Although both these methods produce tough, skin-like coatings that give effective protection to both painted and unpainted aluminum surfaces, the process reported best from a protective standpoint can be outlined briefly: Preclean (if necessary) and rinse. Treat with Alodine, dry, rinse in an acidulated bath, prior to painting only.

A somewhat simpler process for surfaces that will be completely painted is as follows: Preclean (if necessary) and rinse. Treat with Alodine, rinse in either cold or warm water, rinse in acidulated bath at 100° to 120°F, dry and paint. Steps to be taken for applying the coating are outlined in the flow sheet, fig. 3.

In terms of equipment, the treatment of aluminum with Alodine is relatively simple. Special construction is required only in the Alodine stage where stainless steel is employed. All other stages, in most cases, are satisfactory if constructed of mild steel. A full description of each stage is given below.

Stage 1—Suitable tanks or other equipment constructed of mild steel for precleaning with any of the following: Solvents, vapor degreasing, or alkalies. Lead or rubber-lined tanks are required for cleaning corroded work with phosphoric acid metal cleaners. Provision should be made for heating when required

for optimum performance of the cleaner selected.

Stage 2—Rinse tank of mild steel.

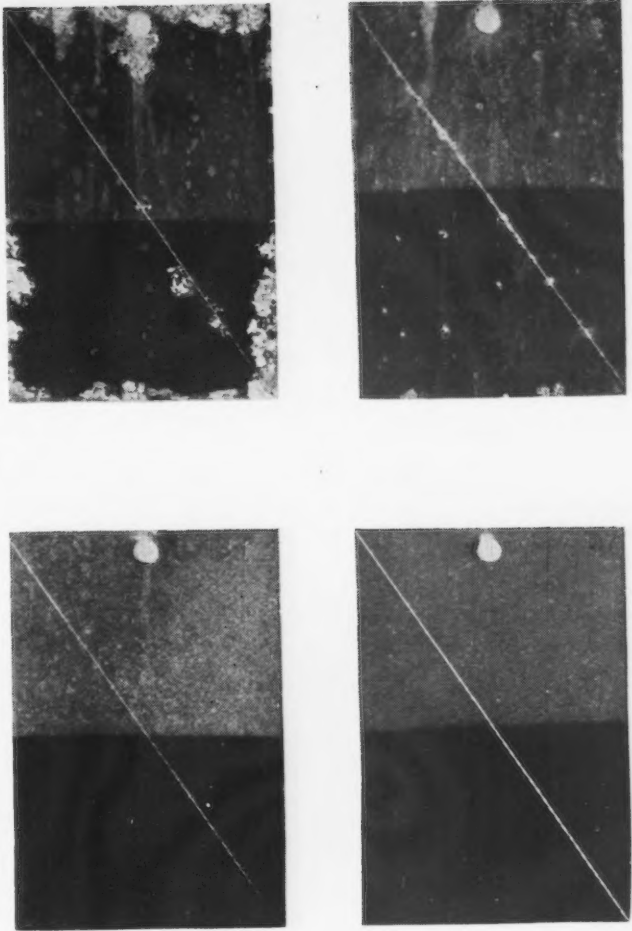
Stage 3—For the immersion process, a stainless steel tank to contain the Alodine solution, with facilities for heating the solution to a temperature of 140°F. If a spray process is used, the requisite stages and drying facilities should be provided in conformance with the flow sheets shown. Equipment in the rinse and acidulated rinse stages can be constructed of mild steel as can equipment in stage 1 if alkalies are used in precleaning. If a phosphoric acid metal cleaner is used on corroded aluminum, the tank of stage 1 should be lined with lead and the pumps, nozzles and piping should be of stainless steel.

Stage 3—When Alodine is sprayed, the equipment containing it must be constructed entirely of stainless steel.

Stage 4—Method No. 1, fig. 5, calls for drying of the work immediately after Alodizing. A drying oven capable of temperatures ranging from 280° to 350°F is required. If method No. 2 is used, immersion in clear water will follow Alodizing, as shown, and a rinse tank of mild steel is necessary for this purpose.

Stage 5—For work that is to be painted, a tank of mild steel is needed to contain a warm acidulated rinse. Maximum temperature required is 120°F. The pump for circulating the acidulated rinse should, for best results, have a stainless steel impeller.

Following the warm acidulated rinse, a drying oven or infrared lamps for final drying is required, before paint or wax finish, to give a temperature of 100° to 150°F. The temperature for drying parts coming from the warm acidulated rinse is much lower than that specified for drying parts coming directly from the Alodizing tank. All tanks should be equipped with skimming troughs and bottom drains for cleaning.



ABOVE

FIG. 2—Series of salt spray test panels illustrating relative values of various preparatory treatments. Upper left solvent wiped; upper right chemically oxidized; lower left anodically oxidized; lower right Alodized.

BELOW

FIG. 4—Aluminum awning parts being Alodized by immersion at the plant of Media Machine Works, Media, Pa.

ALODIZING FLOW SHEET

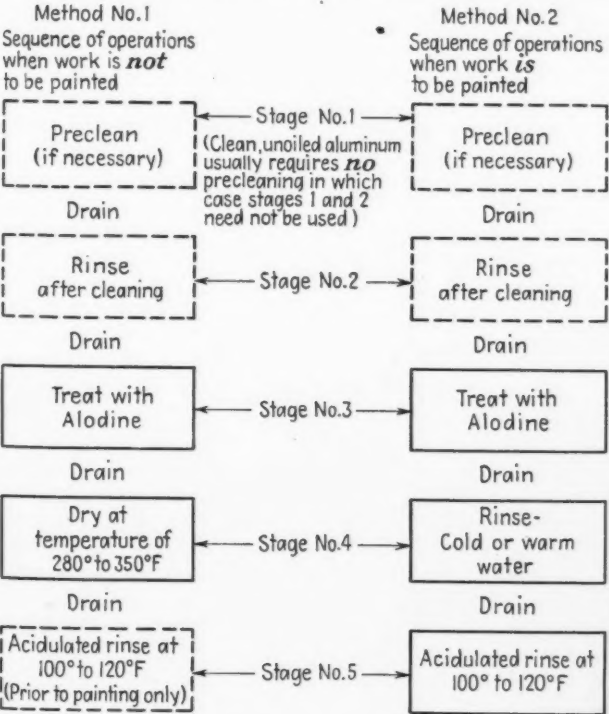


FIG. 3—Sequence of operations for Alodizing aluminum. The treatment can be carried out either by immersing in tanks or by spraying.

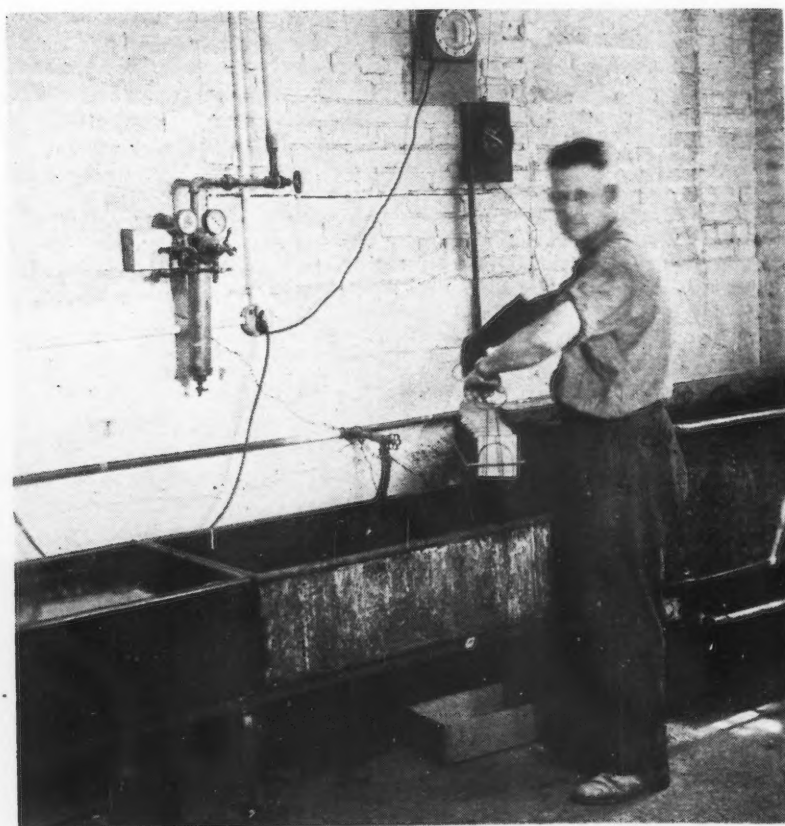




FIG. 5—Typical of the aluminum products being treated by this new process are these outboard motors manufactured by Martin Motors Div., National Pressure Cooker Mfg. Co., Eau Claire, Wis.

Each stage of spray equipment should be provided with the necessary pumps, piping and spray nozzles for completely spraying the work as it passes through the machine on the conveyor. Since the condition of the aluminum surface determines to a large extent the success of the Alodine treatment, there are several important points worthy of mention in this connection.

FIG. 6—View of the simple equipment required to process metal tiles. After 1½ min in Alodine tank on right, tiles are rinsed in clear water in the center tank, then immersed in the acidulated bath on the left and dried. Photograph courtesy Vikon Tile Corp., Washington, N. J.



For removing oil or drawing compounds from uncorroded aluminum of any analysis, any well buffered commercial alkali capable of removing oil without etching the metal will be effective. Provision should be made for thorough rinsing following the precleaning stage especially if an alkali is used. This will prevent excessive neutralization of the Alodine solution

by alkali dragged in on the cleaned aluminum. For removing oil or drawing compounds from corroded aluminum alloys free from copper, phosphoric acid metal cleaners should be used. For cleaning corroded copper bearing alloys, uninhibited alkalis may be used, but two additional operations must then be employed. Following the water rinse after the precleaning operation, a bright dip must be employed to remove the copper smut formed by the attack on the copper bearing aluminum alloy and this bright dip must be followed by another water rinse prior to Alodine treatment.

The Alodine processing time is extremely short, being of 2 min duration, or less. The subsequent stages of rinsing or drying are similarly brief so that the process in its entirety occupies only a fraction of the time normally required by chemical oxidation and anodic oxidation.

Alodine is said to eliminate the necessity for sealing after the production of the protective coating by combining coating and sealing operations. Alodine coatings are described as thin, hard, smooth and tight. They may be made to range from an extremely thin, iridescent film to a somewhat thicker, more densely colored coating. Because of the small amount of metal dissolved and the extreme thinness of the coating, dimensions of treated parts are not appreciably changed. The Alodine coat-

ing is so well integrated with the parent metal and so flexible that stresses arising from bending or denting, or from drawing or stamping operations cannot damage it or impair its protective qualities, the company reports.

Depending on production requirements, Alodine can be applied in either a spray, immersion, tumbling barrel, or flow coat process, as shown in fig. 4. The sequence of operations previously discussed, although carried out normally by immersing the work in solutions contained in suitable tanks, is equally effective when the work is carried on a conveyor through the several stages of a power spray washer, or when large,

stationary work is subjected to the indicated operations.

Since the process utilizing Alodine can be installed without elaborate equipment and can be operated without electric current and in brief operating cycles, and yet provide high-grade surface protection, it is predicted that it will find wide application in practically every fabrication of which aluminum is capable, such as aircraft bodies and parts, trucks and bus bodies and parts, freight and passenger cars, awnings, metal tiles, outboard motors, see figs. 5 and 6, and fountain pens to name but a few possibilities.

Coated Electrode Developed for Automatic Welding

LONG sought by the welding industry, a coated electrode suitable for use in continuous automatic arcwelding machines has just been announced by Holup Corp., Chicago, a division of National Cylinder Gas Co. Designated the Shield-O-Matic, this new electrode combines all the materials necessary for producing a crucible-enclosed arc, while at the same time possessing sufficient flexibility to permit its being used in coil form without cracking or flaking of the coating.

As shown in fig. 1, the construction includes a longitudinally finned core wire, around which are helically wrapped a plurality of fine wires. At each point where the wires contact the fins there is an interlocking that eliminates any possible slipping or unwinding of the wound wire. The spaces between the fins and the wires are filled with flux so as to produce a continuous, seamless coating. Small areas of the wire winding protrude through the coating to provide means for conducting the welding current from the outer surface to the core

wire. This grid construction firmly anchors the coating to the wire and permits the electrode to be fed into the arc from a reel in the same manner as in conventional bare electrode automatic welding.

The composite structure of the electrode further provides for the conduction of unusually high welding currents. The major portion of the current is conducted through the central area of the core wire; however, each of the fin members also conducts welding current, thus creating about the central core welding arc an aggregate of miniature arcs that merge to form a compound arc. This particular design causes electrode and base metal to melt at a much faster rate than usual, thus permitting greater economies in metal fabrication, and greater welding speeds.

Shield-O-Matic welds are said to have unusually high strength and ductility, and to be exceptionally uniform, due to the unique construction by which the fluxing agents and the metallic parts of the electrode are com-

bined in a single product to produce a highly stable arc within a crucible. As compared to those made by conventional automatic welding methods, welds made with the new electrode are said to have a considerably finer grain, and although unusually high welding currents are used, the actual heat input is considerably less than that used for other automatic methods which weld at slower speeds. Residual stresses and distortion are thus proportionately reduced.

While the new electrode can be used in practically all types of welding, present plans call for production of only those electrodes required for welding low and medium carbon steel, and low alloy, high strength steels. The special adapter shown in fig. 2 contains the feed rolls and special current contact jaws and may be attached to all types of welding equipment.

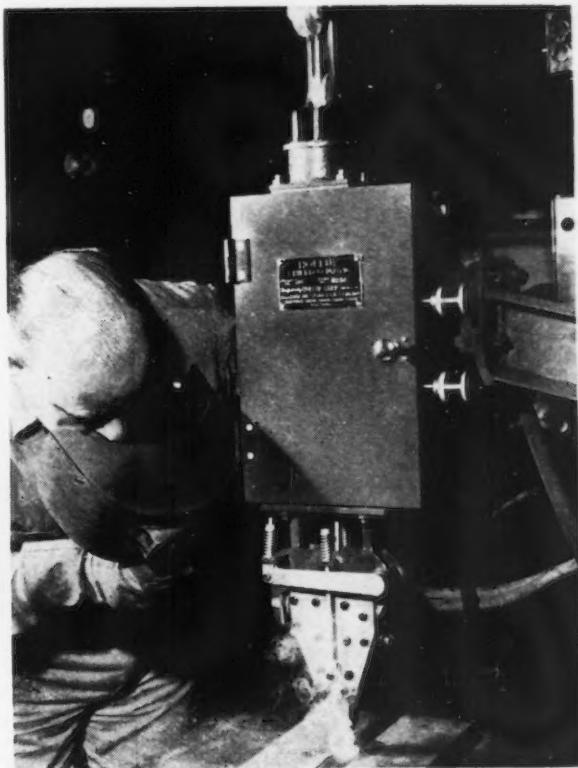


LEFT

FIG. 1 — Sketch showing construction of the Shield-O-Matic electrode. The core wire is finned and wrapped with fine wires which protrude through the coating to convey the current.

RIGHT

FIG. 2 — The special adapter containing the feed and straightening rolls and the current contact jaws may be attached to all types of welding equipment.



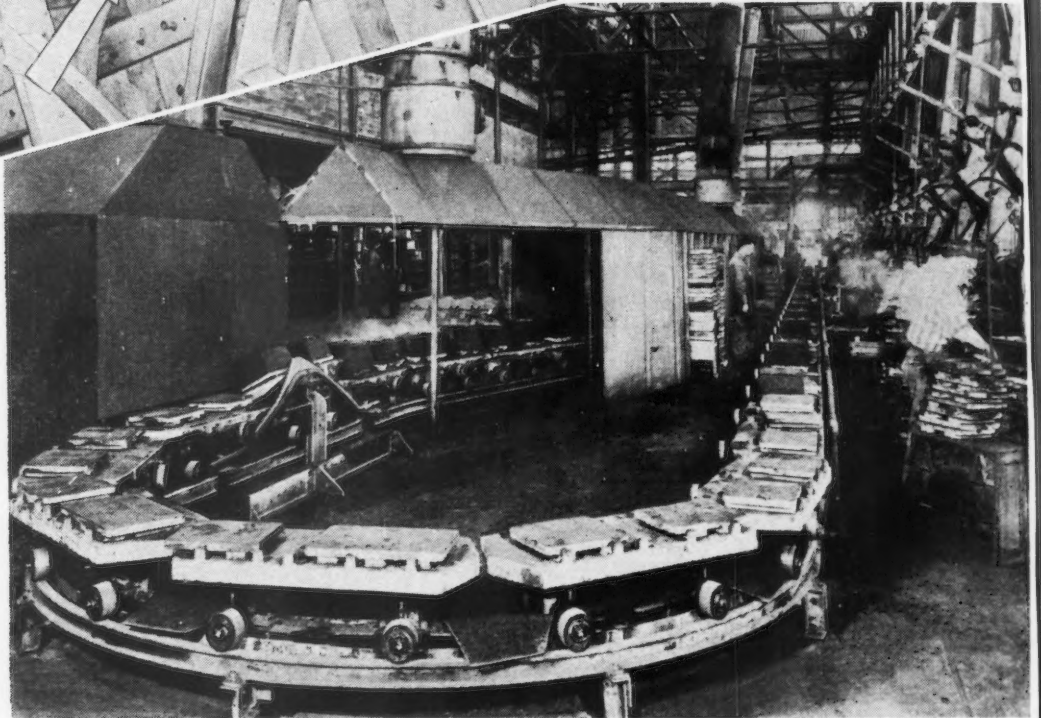
Modern Material H

By N. L. DAVIS

Materials Handling Machinery Div.,
Link-Belt Co.,
Chicago

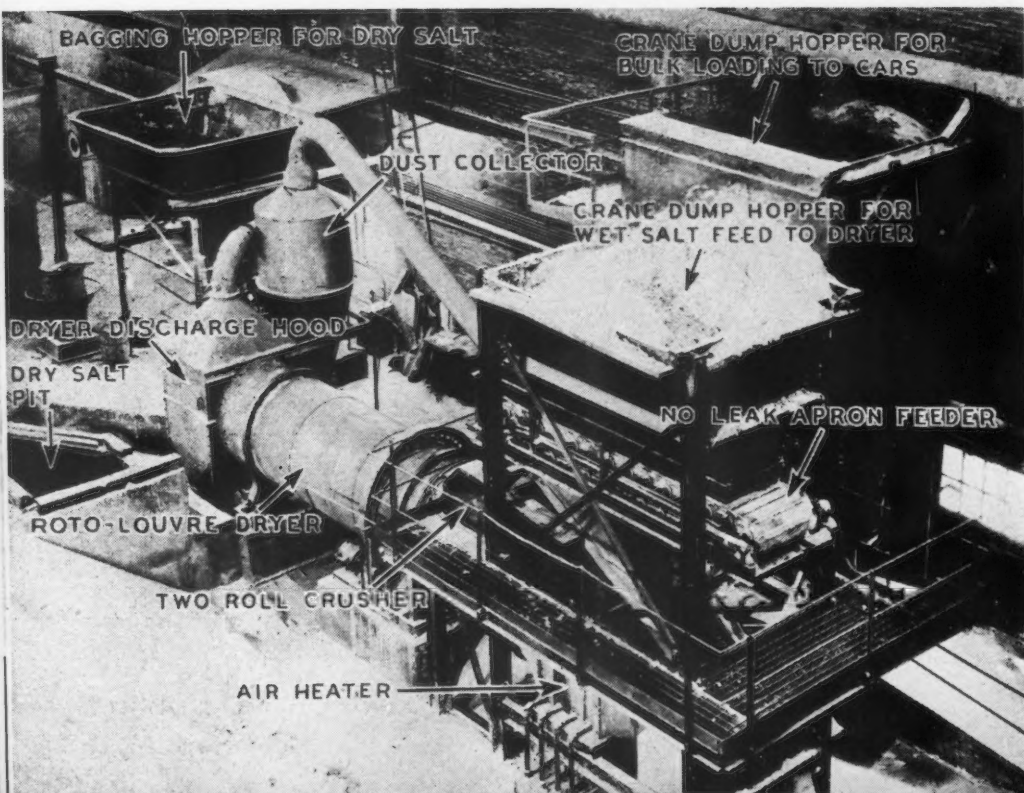
ABOVE

AN installation of rubber tread return idlers on a 42-in. wide belt conveyor on which waste rock is hand picked from run-of-mine ore.



ABOVE

CONVEYORIZED foundry in which a Tru-Trac continuous mold conveyor serves 12 molders making snap flask molds. At the left can be seen poured molds approaching the discharge position from the cooling hood where the automatic discharge of molds is affected.



LEFT

AROTO-LOUVRE dryer installation for the drying of ammonium sulfate at a byproduct coke plant.

Material Handling Ideas for Cutting Costs

War-time developments in material handling, now being utilized to cut peacetime production costs, are discussed herein. Among the applications covered are the use of booster drives to lengthen chain life and eliminate edge damage in handling steel coils, rubber tread return rollers and higher belt speeds to improve ore handling methods, oscillating trough conveyors for rapid, economical handling of mill scale, machine shop scrap and foundry sands, and internal bucket elevators for carrying small parts from a quench.

WARTIME requirements for abnormally high production rates of war materiel and essential products produced many new methods and equipment that can be used in peacetime industry to lower costs of production. These methods applied to the movement of raw material and products are becoming increasingly popular in the metal working industry and in mining operations. A smooth, fast flow of materials and items in the process of manufacture presents a very economical method of raising the productivity of many types of equipment or entire plant operations.

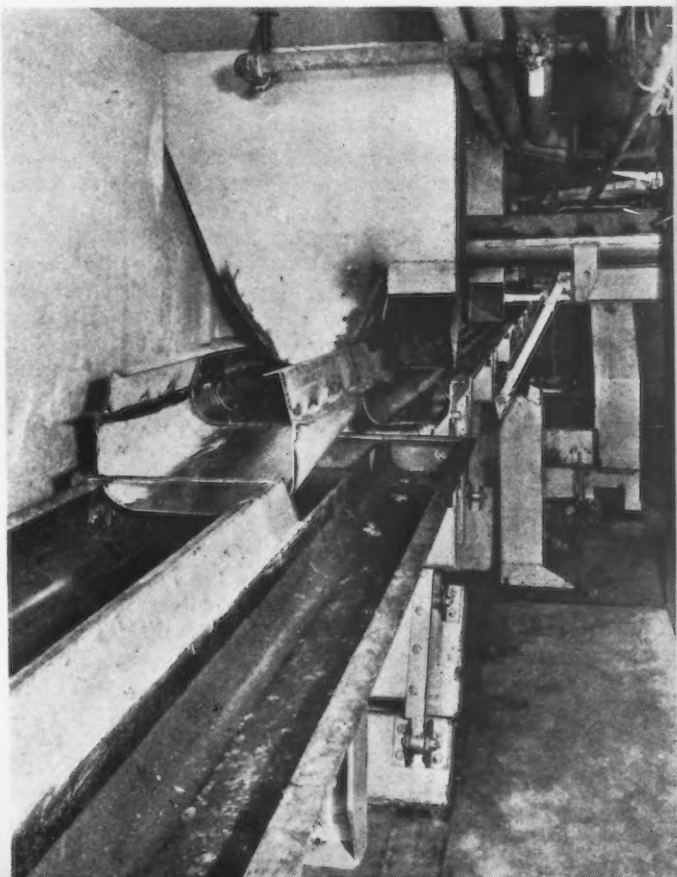
Recent development trends in the ore mines have been to trucks and belt conveyors to either replace or augment previous transportation methods. Iron ore in particular presented a problem, as it is at times exceedingly sticky and means had to be discovered to counteract this undesirable characteristic before the problems of belt conveying and the realization of reduced costs were fully solved. Another problem that had to be overcome in conveying iron ore by a belt system was that the conveyor belt itself was handicapped by the necessary substitution of synthetic rubber covering in place of the natural rubber covering previously used. Since most of the belt conveyor installations consisted of a series of conveyor units, one discharging to the other, it was necessary to have transfer chutes. The first attempt of conveyor belt application to the movement of iron ore resulted in the sticky ore clogging the chutes causing constant shutdowns and interrupted production. The solution to this difficulty was found in operating the belts at speeds which would cause the material to be discharged over the head pulley with a more horizontal trajectory, thus eliminating the need for chute bottoms. Surprisingly, the life of the conveyor belt was not reduced by this technique and the progress made in the development of a good synthetic rubber cover, along with better construction of the fabric of the belt carcass has contributed to the success of conveyorized transportation methods of iron ore.

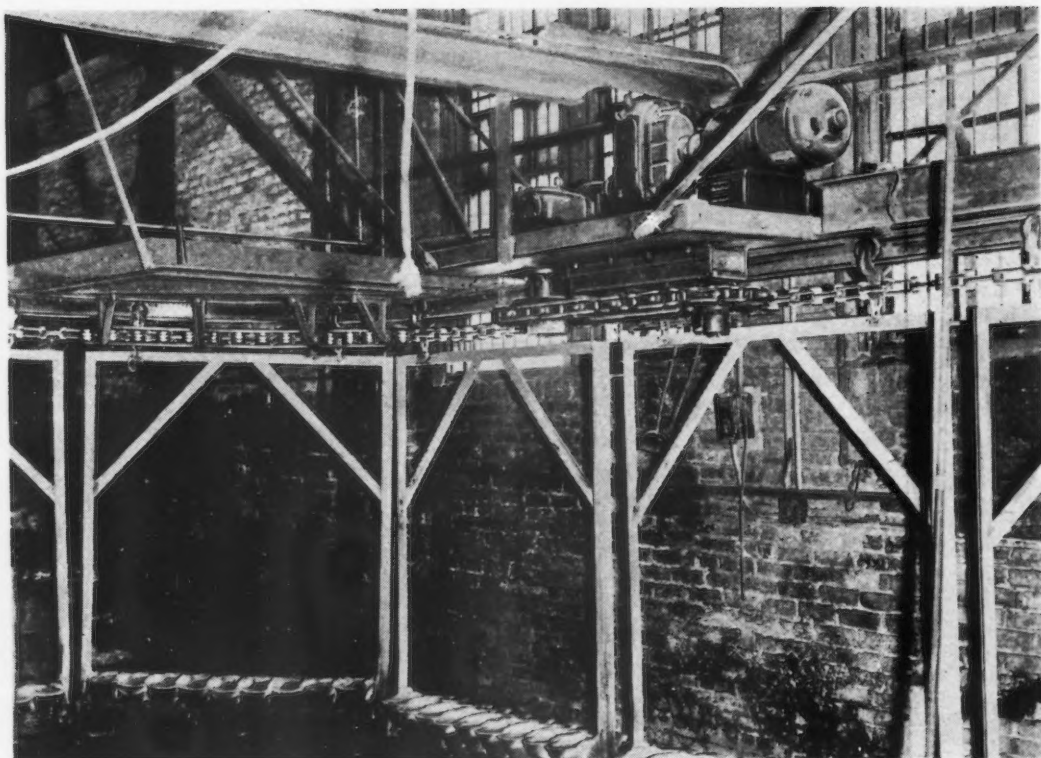
The prevention of build-up of sticky ore on the return idlers was solved with the development of the spaced rubber disc type idler for supporting the return run of conveyor belting. This construction resulted in what might be called a squeegee suction that keeps the belt reasonably clean on the carrying

side. Self-aligning idlers have been developed for both carrying and return runs of belts which cause it to travel in proper alignment. After the initial design of idler roll construction was perfected, additional improvement was made by adequately sealing the antifriction bearings of the idlers against abrasive dust and dirt. Belt conveyor systems, at their present high state of development, are giving excellent service in such applications with a minimum of operational difficulties and at a substantial saving of operational costs.

The use of belt conveyors for handling iron ore at the mine will doubtless also influence future designs for ore handling installations, where stockpiling and

AN oscillating trough conveyor installation under a machine shop for collecting and carrying away, simultaneously, both steel chips and steel ring scrap along with the coolant. Ring scrap is handled in narrow compartment.





A TYPICAL booster type variable speed drive on an overhead trolley conveyor installation. The conveyor handles trays of pivoted molds from the furnace pouring spout to discharge point for the cooled ingots.

reclaiming ahead of the blast furnace are involved. Usually the ore is received in railroad cars at the furnace stockyard and the ordinary practice has been to discharge these cars by means of a high lift type of car dumper. The ore is transferred to another car, in this dumping operation, which is self-propelling and which transports the ore either to the blast furnace stock bins or to digging pits adjacent to one edge of the ground storage piles which are served by man trolley bridges. It now appears feasible to consider the installation of the less expensive rotary type gondola car dumper in combination with belt conveyors for delivering ore to either the stock bins or the digging pits. This would frequently permit lesser initial capital investment and also overall lowering handling costs.

The handling of calcined alumina, a dusty and extremely abrasive material, at the gas producer, frequently at temperatures up to 1800°F, led to major improvements in the construction of the pivoted bucket carrier. Rollers for supporting the carrier line, while traveling in a generally horizontal path, have been removed from the chain joint and relocated between the chain joints and at the same time these rollers have been fitted with antifriction bearings having adequate dust exclusion seals. This major improvement relieved the chain joint of wear resulting from the rotation of the rollers and has materially reduced maintenance cost, increased the dependability and lengthened the life of the equipment. The result is that for handling relatively free flowing granular materials, at capacities up to 300 tons per hr, the pivoted bucket carrier is one of the lowest handling cost per ton elevating and conveying units known today. Such equipment has a very logical application at producer plants in connection with coal handling facilities.

Before the war, most of the continuous steel rolling mills had installed conveyors for the handling of both

hot strip and pickled coils and the rigorous service which these installations were given during the war years has brought to light the need for improvement of their design. The most recent designs for coil conveyors eliminate edge damage to the coils which has previously resulted at transfer points, where rolls served as a support for the coils. Use of the booster drive on such systems has been a decided improvement as the drive not only eliminates the need for conveyor terminal sprocket wheels but also immeasurably increases the life of the conveyor chains. With such an arrangement the power necessary to drive the conveyor is imparted on the straightaway section of the conveyor, rather than at the terminals where the chain joints articulate. Chain tension is thus eliminated at the articulating points along with resultant wear. Use of the booster drive also makes it possible to have a single conveyor of great length because booster drives can be inserted anywhere along the conveyor path without splitting the conveyor installation into separately driven units which would require transfer conveyors for connection.

Beyond such design improvement, much has been learned in the past 4 yr in the use of alloy steels, their heat treatment and finish. This new knowledge has resulted in improved chain joint constructions free of galling (the most serious enemy of chain life). This new chain construction is applicable to hot strip transfer tables, crop end conveyors and any other type of chain conveyor at the steel mill, thus again increasing dependability and reducing maintenance expense for conveyORIZED transportation.

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dryer has enjoyed increased popularity at the by-products plants for the drawing of ammonium-sulfate.

The problem of continuous and economical production at both ferrous and nonferrous metal foundries has been solved through the use of car type mold conveyors. These conveyors employ the same type of booster drive previously described for coil conveyors, and also come equipped with tilting car tops for automatic discharge of the molds at the shakeout points. Pouring platforms have been installed that travel at the same speed as the mold conveyor, thus both improving and easing the job of pouring metal from ladles into molds that are being conveyed at a continuous rate. The oscillating type of conveyor described for the handling of steel scrap at the mill is also used for handling foundry shakeout sand and castings with consequent reduction of maintenance costs. The Roto-Louvre dryer has been successfully used in foundries for the drying of new sand, since it is not only thermally efficient, but can evaporate the moisture without increasing the temperature of the discharged sand above 100°F.

Sand reclaimer kilns, which reclaim up to 90 pct of the silica sand used for cores and molds have been installed in many foundries. Sand put through such a process is sufficiently cool to be placed directly in bin storage ahead of core rooms. The cost of reclamation has been found to be less than one-third the average cost of new sand. From war plants making shells and other products, much has been learned about economies resulting from the use of overhead trolley conveyors, and many new foundries have taken advantage of such systems for handling castings from shakeout stations to cleaning and grinding departments. The trend in

the modern foundry is toward cleanliness, good light and dust free air. Techniques developed by industries specializing in the recovery of dust, have materially contributed to the good results that are now apparent. Part of the new foundry production technique is directed toward 100 pct automatic handling of molds and flasks and good progress is being made in this direction.

Where it is necessary to heat treat small metal parts such as bolts, nuts or washers, a liquid quench of some type is usually involved. The new internal bucket elevator has solved this problem with the consequent saving of considerable floor space because it operates perpendicularly rather than on an incline, as is the case with perforated pan conveyors previously used in quench tanks.

Oscillating conveyors have another application which has saved considerable labor and improved the general housekeeping of plants. Such conveyors can be installed in a shallow trench underneath batteries of machine tools and are capable of economically handling the machine borings, turnings, and production scrap.

Overhead conveying for plants employing progressive production and assembly methods has solved the problem of dispatching work in a manner that is not only exceedingly accurate but also susceptible to predetermination. Lateral trolley conveyor lines are being installed to transport and properly time the delivery of component parts required by a progressive assembly system in such a way that the entire production effort is correlated. Through such systems major improvements in efficiency and cost reduction as well as stepped up production rates for a given number of machines or personnel have been achieved.

Drilling Closely Spaced Multiple Holes

BY means of a novel arrangement of indexing, a Zagar 2000 Series, 7-spindle gearless drill head and a 1-in. capacity Zagar index fixture, in one cycle, drill seven holes, which cannot be drilled together in one place, at one time.

By combining these two standard Zagar products, as shown in the accompanying illustration, seven sizes of holes, ranging in size from No. 40 to 5/32 in., are drilled into a socket part at very close distances. The spindles are spread over a predetermined distance, and alternate holes are drilled at various positions, by the indexing method.

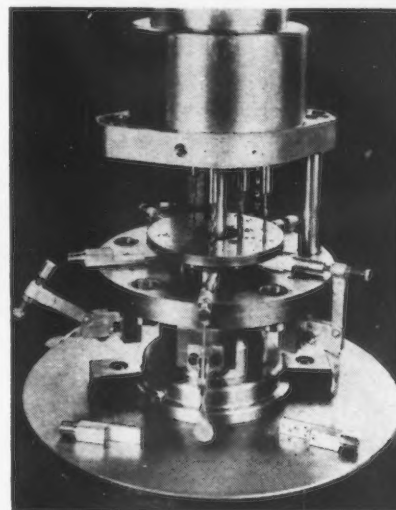
The first position is for loading and unloading of work only. Work is held in position by toggle clamps. After the part is loaded, it is indexed to the second position, where one hole is drilled. While the part is being drilled at position two, a part is being loaded at the first position. Indexing to position three, allows two more holes to be drilled in the first part; one hole to be drilled in the second part, which is at position two; and a new part to be loaded at the first position.

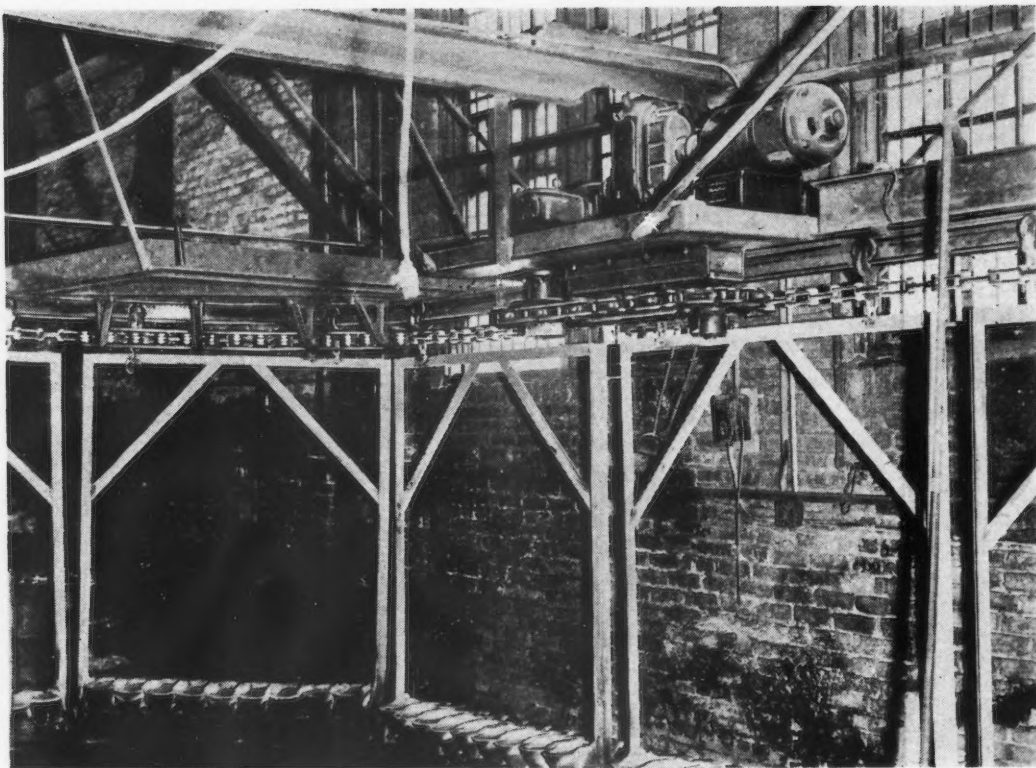
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The plant using this combination produces more than 450 completely drilled parts per hr. All tooling for the unit was designed and built by Zagar Tool, Inc., Cleveland.

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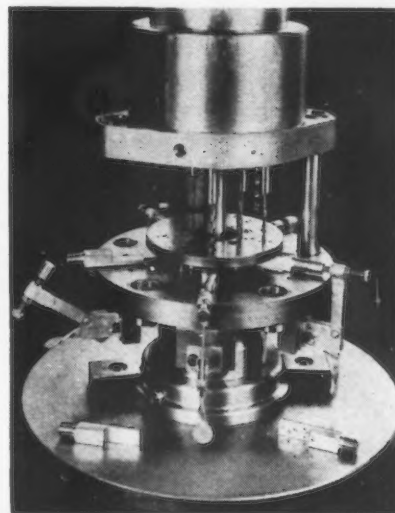
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Effect of Particle Size On Iron Powder Properties

As in other industrial processes, so in powder metallurgy, control of raw materials is necessary in order to obtain uniformity in finished product. In this, the first part of a two-part article, the authors report results of an extensive wartime research program, in which two reduced-type and two electrolytic iron commercial powders were investigated as to the effects of particle size on properties of powders and powder compacts.

DURING the past few years the powder metallurgy process has been applied in the manufacture of small mechanical parts; cams, bushings, gears, etc. In a number of cases, the advantages of the application of this molding technique to produce such parts more economically through the elimination of scrap and machining operations have been demonstrated. On the other hand, it is felt by many that there are a number of parts still being made by other methods to which the powder metallurgy process could be successfully and advantageously applied. This is particularly true of ferrous base materials.

Control of raw materials is of utmost importance in all industrial processes if a uniform product is to be prepared. In the powder metallurgy process, control of the properties of the metal powders used is also necessary, especially if parts are to be held to close dimensional tolerances, one of the advantages claimed for the process. Standard methods of powder tests are gradually being adopted by the industry.

There are two types of iron powder in use for the production of molded iron parts: One is the type produced by reduction of iron oxide. The oxides for the domestic powders are produced from scrap iron or mill scale. Swedish iron powder is produced by refining and reduction of natural ores. The reduced type of iron powders is the cheapest available at the present time.

The second powder type is that produced by electro-deposition. The electrolytic powders are of higher purity than the reduced type, and denser parts with

better mechanical properties can be obtained for a given molding pressure and sintering temperature and time. These powders are considerably more expensive than the reduced type, although this condition is at least partly due to the limited amount of electrolytic iron powder now being manufactured.

The powder metallurgy laboratory at Stevens Institute of Technology was authorized by the Office of Production Research and Development, under WPB Contract 219, to work on a research project to show the effect of particle size of iron powders on the properties of the powders and iron powder compacts. With the previously mentioned considerations in mind, a program was laid out under which two standard domestic reduced type powders and two standard electrolytic type powders were subdivided into a range of particle size fractions, and each fraction as well as the original powders were submitted to a definite test procedure. These tests showed that the particle size of iron powders has a significant effect on the following properties of the powders and powder compacts:

<i>Powders</i>	<i>Compacts</i>
Apparent density	Compressibility ratio
Relative flow	Dimensional change on sintering
Weight loss in hydrogen	Tensile strength

Originally it had been intended to utilize the iron powder fractions prepared at the Armour Research Foundation, but the quantities available were found insufficient to permit all the tests desired. It was decided, therefore, to employ four new commercial iron powder lots, two of the reduced type and two of the electrolytic type, as follows:

- (1) Powder A—Metals Disintegrating MD 111 reduced iron powder lot 354
- (2) Powder B—Plastic Metals "Plast-Iron" annealed electrolytic iron powder, lot 3164
- (3) Powder C—Metals Refining I-297 reduced iron powder, lot 4045
- (4) Powder D—National Lead "Lectrofer" annealed electrolytic iron powder, lot 2PR3K30

Each of these four lots was subjected to chemical analysis with the results given in table I.

Each of the powders was divided into the following fractions: (A) Original powder as received; (B)

TABLE I
Chemical Analyses

Element	Powder			
	A	B	C	D
Total Fe.....	97.55	99.67	97.55	99.12
Metallic Fe.....	90.97	95.29	93.95	95.20
Total C.....	0.29	0.04	0.24	0.09
Si O ₂	0.15	0.02	0.22	0.04
S.....	0.007	0.024	0.028	0.011
P.....	0.023	0.005	0.017	0.005
Mn.....	0.17	0.08	0.20	0.03
Other elements*	.....	.....	0.1-0.15 Ni	.....

*Qualitative spectrographic analyses were made for all elements other than those listed above. Where not otherwise noted, no element was found to be present in the first decimal place, with the exception of oxygen. The latter is discussed in "Weight Loss in Hydrogen."

—100 +150 mesh (av. 126 microns); (C) —150 +200 mesh (av. 88 microns); (D) —200 +325 mesh (av. 58 microns); (E) 44 —30 microns (av. 37); (F) 30 —20 microns (av. 25); (G) 20 —10 microns (av. 15); (H) 10 —0 microns (av. 5).

Fractions B, C, and D were separated by sieving, and fractions E, F, G, and H were separated by air classification on the Federal classifier. To the original

This article, which covers an OPRD wartime research project, was prepared by the following members of the staff of the Metal Powder Laboratory, Stevens Institute of Technology, Hoboken, N. J.: J. F. Kuzmick, former assistant director, J. D. Shaw, assistant director, and C. L. Clark, T. W. Frank, W. V. Knopp and A. S. Margolies, research fellows. The authors have expressed appreciation to G. J. Comstock, director, for his guidance and direction in the investigation reported herein.—Ed.

powder and the fractions B, C, D, E, F, and G, the standard tests were applied. In all cases, fraction H was present in such small quantity that no tests could be applied.

Each powder was conditioned for sieving by quartering and blending until the entire lot was uniformly mixed. Charges of 600 g were used and the sieving time was 30 min on a Ro-Tap machine. Enough powder was sieved to provide at least 2 lb of each fraction. Particle size ranges given for fractions E, F, G, and H are normal only, since the Federal classifier does not give an absolutely sharp separation. However,

The statistical method followed in this research was described in "The Statistical Approach in Industrial Research," THE IRON AGE, Aug. 22, 1946, p. 50. Other recent discussions of powder metallurgy published in THE IRON AGE include "Properties of Sintered Iron-Copper Powders, Aug. 15, 1946, p. 57; "Welding With Powdered Metal," June 20, 69; "Production Problems Studied by MPA," June 20, p. 78; and "Heat Treating Carburized Sintered Steel," Apr. 25, p. 56.

this method of preparing the finer fractions represents a commercial procedure. The separation on the Federal classifier was checked by microscopic count.

Tests on Powder

The following tests were applied to the six fractions as well as to the original powder. All the tests on both powders and compacts were run in triplicate.

Apparent density—Determined by the use of a standard Scott Volumeter.

Flow—Determined by running 50 g of powder through a standard metal powder flow meter which was originally calibrated with Turkish emery, and measuring its flow rate.

Weight loss in hydrogen—Obtained using 10 to 15-g samples of powder. Powder was placed in a weighed Zircofrax boat and reduced in a small, tube-type hydrogen furnace for 30 min at 2012° F and cooled for 30 min in hydrogen atmosphere. The boat and powder were reweighed after reduction, then the powder was removed from the boat and the boat itself reweighed to allow for any changes in weight of the boat itself. From this data the exact loss of weight of the powder in hydrogen was computed on a percentage basis.

Preparation of Compacts

The iron powder compacts were produced from the original powder and each fraction under the following standard conditions: (1) molding pressures—25 and 50 tons per sq. in.; (2) sintering temperature—2012° F; (3) sintering time—30 min at temperature; and (4) sintering atmosphere—hydrogen (deoxidized and dried).

The following specimens were made up from each fraction and the original powder: (1) Cylindrical specimens (½ in. diam) using 5 g of powder for each specimen; (2) Cylindrical specimens (¾ in. diam) were prepared using 30 g of powder, and (3) Tensile specimens were prepared using a standard split die available at the Stevens laboratory. The shape of the tensile specimens is shown in fig. 1. From the compressibility ratio of the various fractions and the original powder, which was computed on previous specimens, the proper weight of each powder was calculated and used to produce specimens of approximately equal thickness. Each specimen weighed about 25 to 30 g and was approximately 0.2 in. thick.

Unsintered Specimens

The compressibility ratio was computed on the ½ in. diam cylindrical specimens from the ratio of the density of the pressed piece and the apparent density of the powder.

A copy of the procedure and a sketch of the apparatus used by the New Jersey Zinc Co. for green strength tests in the work done under Research Contract WPB-16 were obtained and similar apparatus was built at Stevens. Briefly, this test consists in tumbling ½ in. diam x ¼ in. thick specimens in a 3½ in. diam screen cylinder containing ½ in. wide longitudinal baffle. The cylinder is rotated horizontally on its axis for 1500 revolutions at 83 rpm. The percent weight loss of each specimen is taken as a measure of green strength. In this case the cylinder speed was 90 rpm.

After the tests were completed on the first powder (powder D) it was found that the weight losses were extremely small. Therefore, the specimens for the other three powders were run for 3000 revolutions instead of 1500 revolutions. The density of the unsintered compacts was computed on the ¾ in. diam specimens from their weights and dimensions.

Sintered Specimens

The linear change on sintering was checked on the diameter and length of the ¾ in. diam specimens. This was done simply by measuring the specimens before and after sintering and computing the dimensional change on a percentage basis. The density of the sintered compacts was computed on the ¾ in. diam specimens from their weights and dimensions.

Hardness was measured on both tensile specimens

and 3/4 in. cylindrical specimens for both pressures and all fractions, using the Rockwell H scale. Tensile strength was obtained by breaking the tensile specimens in a Riehle Model 505 hydraulic tensile test machine and calculating the unit strength. Percent elongation was determined on the tensile specimens by placing 1 in. gage marks on the test pieces before breaking and measuring the distance between these marks after breaking, then computing the percent elongation.

Results

Particle Size Distribution—A study of the particle size distribution, as shown in table II for all the iron powders, indicates that powders A and D have practically no material +100 mesh, while powders B and C contain over 1 pct +100 mesh, suggesting the need of improved screening technique to remove oversize particles in powders B and C. All powders are substantially free from superfine (—10 micron) dust.

Apparent Density—The results of the tests on apparent density are given in table III. Apparent densities of the two electrolytic powders (B and D) are higher than those of the two reduced powders. However, the difference between powders B and D is approximately twice the difference between powders B and either of the reduced powders (A and C).

The apparent densities of the original powders, with the exception of powder A, are higher than those of any of the individual fractions. This is to be expected since the original powders contain all the various size particles and the fine particles occupy the voids between the coarse ones, thus decreasing the bulk of the powder. In powder A, the subsieve fractions, E, F, and G have somewhat higher apparent densities than that of the original powder.

The probable reason for this is that the coarse fractions are so much lower in apparent density than the fine fractions that the effect of the latter in the original powder is insufficient to raise its density to the maximum.

Normally it would be expected that the finer powder fractions would have lower apparent densities, because of the greater opportunity for bridging to occur in fine powders. This trend is not shown by powders A, B, and C. Two possible causes of this are greater individual densities of particles in the finer fractions compared to those of the particles in the coarser fractions and differences in particle shape from fraction to fraction.

Relative Flow—The results of the flow tests on the

original powders and the various fractions are also given in table III. The percent flow was calculated as follows:

Percent Flow = (Standard Flow (sec) / Actual Flow (sec)) x 100

The standard flow was used as the numerator in this calculation so that the computation would give increasing percent flow with increasing flow rate (shorter flow time).

A study of table III shows that the electrolytic powders B and D have higher relative flow rates than the reduced powders A and C. However, the greater relative flow rate of the electrolytic powders is apparently due to greater apparent density, since flow

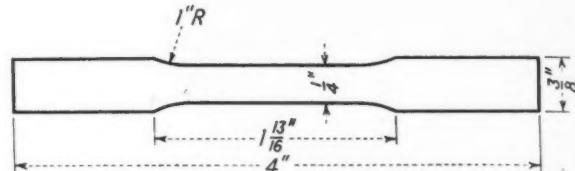


Fig. 1—Sketch of tensile specimens.

is measured on a weight/time basis. If relative flow were measured on a volumetric basis, there would undoubtedly be much less discrepancy in flow rate between the reduced and the electrolytic powders.

In electrolytic powder D, there is a tendency for the flow to drop with decreasing particle size, reaching a point in the subsieve powders below which no relative flow results, probably because of the greater opportunity for bridging to occur. In electrolytic powder B the relative flow remains fairly constant with decreasing particle size down to the same point, below which no relative flow occurs. With each of the reduced powders, A and C, relative flow reaches a maximum value for fraction D of powder A and for fraction E of powder C—and then decreases sharply, the finest fractions showing no relative flow. In powders B and D, the original powder has a lower flow rate than the coarse fractions, as might be expected since the coarse fractions contain no fines to immediately flow. This condition does not hold for powders A and C. The flow on the original of powder A is about the same as for the coarse fractions, and the flow on the original powder C is slightly higher than that of the coarse fractions. From a study of the flow of powders

TABLE II
Particle Size Distribution

	POWDER			
	A	B	C	D
Screen Test				
Fraction				
Oversize				
+100 mesh	0.08%	1.18%	1.23%	trace
B (105 - 149 microns)	9.57	11.06	15.35	2.70%
C (74 - 150 microns)	19.78	24.38	31.28	32.27
D (44 - 74 microns)	31.93	22.25	27.88	32.70
Subsieve	38.67	41.12	24.28	32.33
Subsieve Distribution				
Fraction				
E (30 - 44 microns)	13.72%	10.05%	7.09%	10.31%
F (20 - 30 microns)	13.38	11.02	8.26	12.88
G (10 - 20 microns)	11.39	19.79	8.76	8.89
H (0 - 10 microns)	0.18	0.26	0.15	0.25

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A and C and the relative amounts of each fraction therein (table II) it can only be concluded that there is sufficient of the maximum flow fractions in each powder to more than offset the impedance to flow caused by the finest fractions. This results in the original powder having a flow as good as or better than the coarse fractions. In addition, powder C contains some oversize (+100 mesh) particles which would also tend to increase flow.

It should be noted that the term "no relative flow" does not describe for different fractions a constant condition. The test requires that the entire 50-g sample flow through the funnel orifice without external agitation. With the exception of fraction E of powder D all samples not meeting this requirement were classified as "no flow". Actually in some cases part of the sample did pass through the orifice. This, when considered along with the design of the funnel and the size of the sample, emphasizes the arbitrary nature of the test.

Weight Loss in Hydrogen—The results of the tests on the weight loss in hydrogen are also shown in table III and are plotted in fig. 2. From fig. 2 it can be seen that powder D has the lowest weight loss in hydrogen for all fractions and for the original powder. Both of the electrolytic powders, B and D, have a lower weight loss in hydrogen than the reduced powders A and C.

Powders B and C show a definite trend of increasing weight loss with decreasing particle size. Powder D has been so thoroughly reduced in its annealing treatment that the weight loss curve is substantially level for all fractions until fraction G is reached, where a slight increase is shown. Powder A follows the trend noted for powders B and C in the coarser fractions, but drops to a minimum for fraction F, followed by a sharp increase in the finest fraction G.

Since smaller particles have a greater surface area per unit volume, one would expect increasing weight loss (mainly attributable to oxide content) with decreasing particle size. The failure of fractions E and

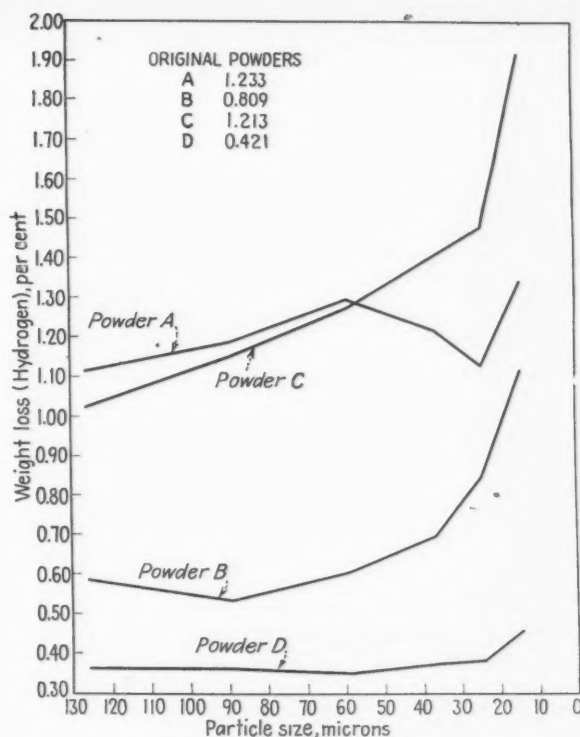


FIG. 2—Percent weight loss (hydrogen) v. particle size.

F of powder A to follow this trend would cause one to suspect that a portion of the fines of this powder may have been blended into this particular lot from another lot of lower oxide content.

The weight loss in hydrogen is an approximate measure of the oxygen content of the powder. If the weight losses for the original powders are compared with their chemical analyses, it can be seen that the powders which have the lowest metallic iron content have the highest loss in hydrogen. Most of the contained oxygen must therefore be present as iron oxide. This would partially explain the gap between the actual total weight percent shown by the chemical analyses and the theoretical total of 100 pct.

It is to be expected that the average weight loss in hydrogen of all the fractions of any powder should equal the weight loss in hydrogen of the original powder. However, since there was only a very small quantity of superfine dust present in all powders, it was not possible to recover a sufficient amount of this material to subject it to test. In addition, no measurement was made on the oversize (+100 mesh) fraction contained in both powders B and C. The average weight loss in hydrogen of the original powder as compared with the weighted average of fractions B, C, D, E, F, and G is given in table IV.

Since the weighted average weight loss in hydrogen of fractions B, C, D, E, F, and G of reduced powders A and C approximates the weight loss of the original, we can expect that the superfine dust (—10 microns) does not differ appreciably from fraction G in weight loss in hydrogen. Any oversize (+100 mesh) material present in the original powder would tend to have substantially the same weight loss as fraction B (—100 +150 mesh). The weighted average weight loss in hydrogen of fractions B, C, D, E, F, and G of electrolytic powders B and D is considerably lower than the weight loss of the original powders. This

TABLE III
Powder Tests

Apparent Density, g per cc	Powder			
Fraction	A	B	C	D
A (original).....	1.95	2.42	2.09	3.25
B.....	1.74	2.18	2.00	3.21
C.....	1.81	2.15	2.03	3.12
D.....	1.84	2.18	1.95	2.97
E.....	2.06	2.33	2.03	2.98
F.....	2.01	2.23	1.92	2.75
G.....	1.97	2.20	1.88	2.50
Percent Flow, (standard 50 g 29.3 sec = 100 pct)				
A (original).....	91	95	101	154
B.....	88	111	97	173
C.....	90	114	99	173
D.....	96	113	98	157
E.....	no flow	112	107	158*
F.....	no flow	no flow	94	no flow
G.....	no flow	no flow	no flow	no flow
Percent Weight Loss:				
A (original).....	1.233	0.809	1.213	0.421
B.....	1.116	0.585	1.027	0.365
C.....	1.189	0.533	1.156	0.364
D.....	1.297	0.603	1.277	0.350
E.....	1.216	0.697	1.411	0.371
F.....	1.129	0.851	1.477	0.381
G.....	1.345	1.120	1.915	0.457

*Flow tended to be irregular. Powder bridged and would not flow unless cup was tapped once or twice.

indicates that a large portion of the oxide content is present in the small amounts of superfine (—10 micron) material. Powder B contains 1.18 pct oversize (+100 mesh) material which may partially influence the result, but powder D does not have any oversize material so that the entire effect on powder D may be attributed to the superfine dust. A theoretical calculation for powder D indicates that this superfine fraction would show a weight loss in hydrogen of 20.4 pct. This calculation follows:

Powder D

Original sample A, hydrogen loss 0.421 pct
 Weighted average hydrogen losses for
 fractions B, C, D, E, F, and G 0.371 pct
 The original powder (A) represents 100 pct of
 material.
 Fractions B, C, D, E, F, and G represent 99.75 pct of
 material.
 $(0.421 \times 100.00) - (0.371 \times 99.75) = (X \times 0.25)$.
 $X = 20.4$ pct hydrogen loss for superfine fraction.
 This is a computed value.*

This same theoretical calculation was made for powder B as follows:

Powder B

Original sample A, hydrogen loss 0.809 pct
 Weighted average hydrogen loss for frac-
 tions B, C, D, E, F, and G 0.724 pct
 The original powder (A) represents 100 pct of
 material.
 Fractions B, C, D, E, F, and G represent 98.56 pct of
 material.
 Oversize powder (+100 mesh) representing 1.18 pct

TABLE IV
Average Weight Loss In Hydrogen, Pct

Powder	Original Powder A	Fractions B-C-D-E-F-G
A	1.233	1.230
B	0.809	0.724
C	1.213	1.263
D	0.421	0.371

of material is taken to have a hydrogen loss equivalent to fraction B (—100 + 150) 0.585 pct
 $(0.809 \times 100.00) - (0.724 \times 98.26) - (0.585 \times 1.18)$
 $= (X \times 0.26)$.

$X = 33.9$ pct hydrogen loss for superfine fraction.
 This is a computed value.*

* Since the weight of superfine (—10 micron) material is a small portion of the entire powder and is determined indirectly by weight difference in the separation of the powders into their respective fractions, it follows that the calculated weight loss in hydrogen will vary considerably with any small change in the weight of the superfines. However, the magnitude of the calculated values for both powders B and D are such as to definitely indicate the presence of considerable oxide in the superfine dust.

From this one can conclude, even with the assumptions made, that if the very small quantity of superfine dust present was entirely eliminated from the original electrolytic powders, the oxide content of the powder could be decreased by more than 10 pct.

The authors will continue their discussion of results of this investigation in a subsequent issue.

Seam Welding Stainless Steel Foil

SPOT and seam welding of stainless sheet is now being performed successfully on even the lightest gages of stock, but an exceptional operation is reported

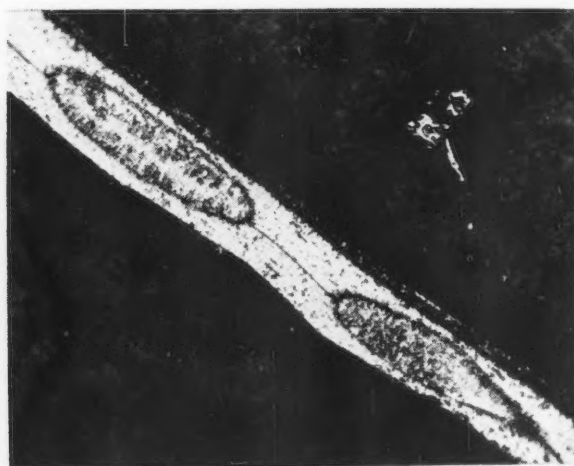


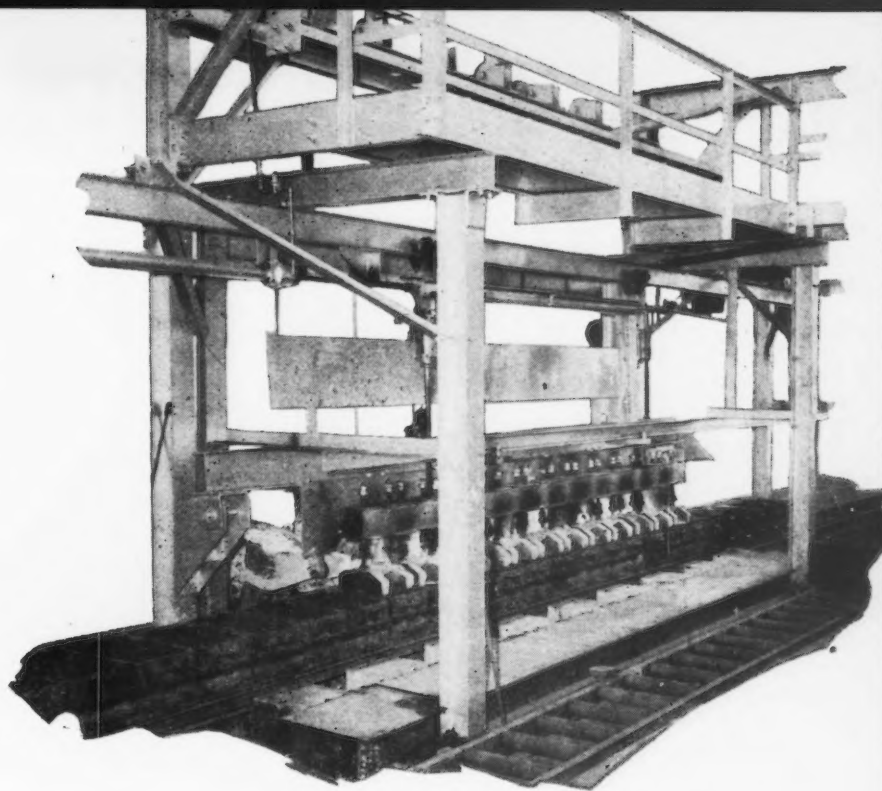
FIG. 1—Seam weld in 0.0015-in. stainless steel type 302 made at double speed to expose the individual weld nuggets.

by Solar Aircraft Co., San Diego, Calif., for the fabrication of insulation blankets for one of the latest types of turbo-jet aircraft engines. This consists of seam welding type 302 stainless steel in thicknesses of only 0.0015 in.

Shown in fig. 1 is a photomicrograph (150X) of a seam weld made by standard procedures, except that the welding speed was doubled in order to expose individual nuggets for inspection. The diameter of the nugget shown is 0.011 in. along the major axis, and 0.0023 in. on the minor axis. Weld penetration is approximately 72 pct, and the nuggets show no evidence of voids, cracks, inclusions, or abnormal structures.

For successful resistance seam welding of this unusual material it is recommended that an electrode force of 120 lb be employed, with timing of 1 cycle on and 1 cycle off. Approximately 4000 amp current is required, using RWMA class 1 electrodes 8-in. diam. 3/16-in. wide, with a 1½-in. radius face. For gas tight welds a speed of 18 ipm has been found most suitable, with a production of 100 spots per in. Surfaces to be welded should be clean and free from grease or other foreign matter, and care should be taken to see that they are not contaminated by finger prints. A light burnishing with No. 400 emery paper is recommended.

Mechanical Pouring Unit Handles 11 Tons Per Hour



General view of the mechanical pouring unit.

By J. R. SHEPARD
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At American Brake Shoe a means of pouring 370 brake shoe molds an hour has been developed. This system of centralized mechanical pouring described in this article, which utilizes push button control, has succeeded in converting the pouring operation from several difficult jobs requiring five to six pourers to one requiring but one operator working in safety and comfort.

POURING of 370 brake shoe molds an hr has been achieved by the American Brake Shoe Co. through its installation of centralized mechanical pouring. Controlled by remote push button control, this equipment operates at a rate of 11 tons per hr by one operator in comfort. Formerly, five to six pourers were used.

This system, for which patent application has been made, was designed at the company's construction and maintenance department under the direction of W. S. Fraula, assistant to the president, and was assembled in the company's own shops. Its advantages which were particularly patent during the manpower shortage in converting several tough jobs into one of safety and comfort have been proved so worthwhile that this

plan is being extended to all plants where layout permits its use.

In the Brake Shoe's roll conveyor type mechanized foundries, brake shoe molds, made in cast iron flasks with a 1/4-in. steel plate used for a bottom board, are placed on a fabricated steel pallet. Each pallet holds nine molds and is built from two Z bars welded together with struts. As each pallet is filled, it is pushed down roll conveyor lines where pouring was formerly done with hand buggy ladles. The molds were weighted at fixed stations by means of air operated weight lifters which raised and lowered nine pouring weights. After pouring, the molds were pushed to the end of the roll conveyor line and transferred to gravity lines for return to the shakeout.

Because of the uniformity in size of the molds, centralized mechanical pouring was for some time deemed feasible. Early attempts to use a large ladle with nine spouts met with failure since it was impossible to keep an equal flow of iron from each lip. Also when one mold refused to take metal, it meant spilling a great deal of iron or pouring the other eight molds short. It was realized that it would be necessary to have separate ladles that could be actuated individually, and, after many months of trial and development, the electrically controlled hydraulic system was unfolded.

The heart of the system consists of six ladles (fig. 1) each holding 500 lb of metal, each ladle being supported by an individual lift cable and also fixed supports for pivoting each ladle. The ladles are supported over a pit with a sand bed to catch spill iron and are tilted by means of hydraulic cylinders through a cable, and a trunnion fixture. A schematic view of the pouring unit is given in fig. 2.

The pallets of molds are conveyed to the pouring

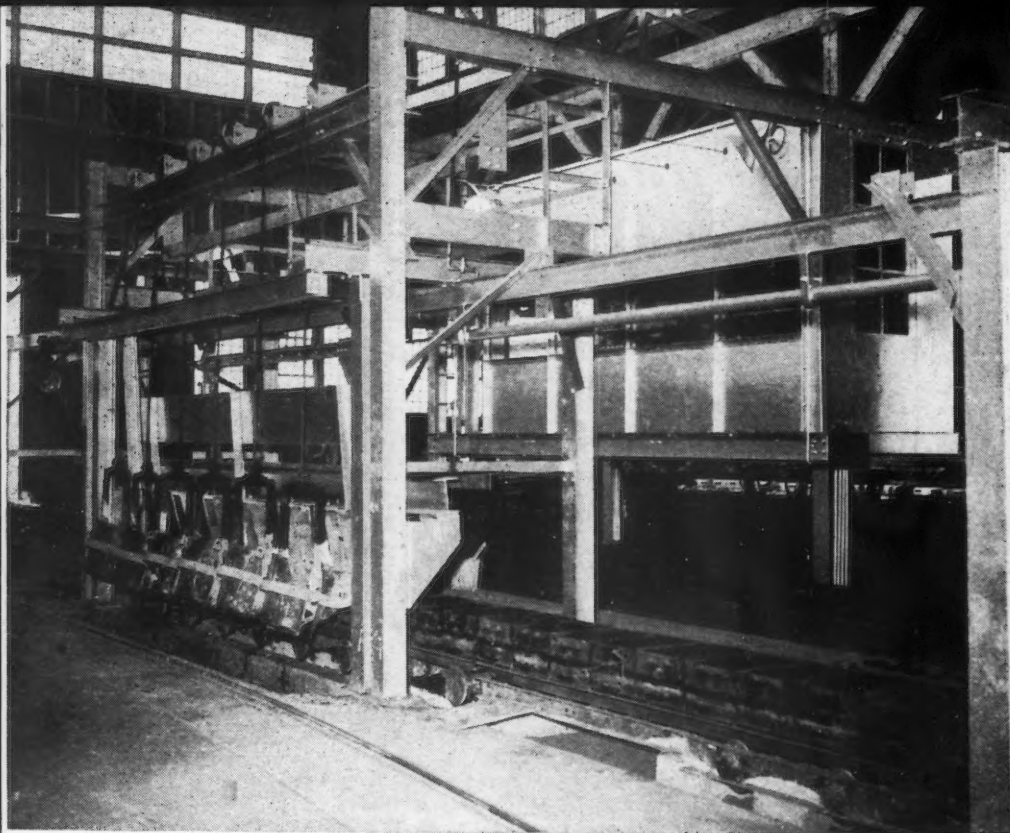


FIG. 1—This view toward the rear of the ladles shows the power conveyors, pit and control room. The operator in the tower room controls the 500-lb ladles. Six ladles are poured into the molds simultaneously.

station by means of powered roll conveyors. The first conveyor, called the feed conveyor, is used to bring the pallets to the ladles. It is constructed of multiple rollers, and each roller is composed of two chilled wheels fixed to a shaft. The conveyor is powered with

turned by means of a long air cylinder, to a definite location for lowering on the next set of unpoured molds. Six ladles are used, spaced at every other mold, thus necessitating one short movement and one long movement of the conveyor to pour 12 molds.

a 3-hp Master Gearhead motor with a Uni-Brake to prevent coasting and for accurate spotting. Power is transmitted to each shaft by means of a series of progressive chains and sprockets. The power conveyor in front of the ladles, called the pouring conveyor, is similar to the feed conveyor except that outboard bearings are used to keep them away from the heat of the spill iron in the pit. The live rollers are positioned midway between the ladle spouts to prevent spillage of iron.

The molds are weighted by means of a traveling air-operated weight lifter. Twelve weights, hung on a monorail carriage, are lowered and raised vertically by air cylinders. After the molds are poured the weights resting on the pallets travel with the pallets over the pouring conveyor away from the pouring station. The weights are then raised and re-

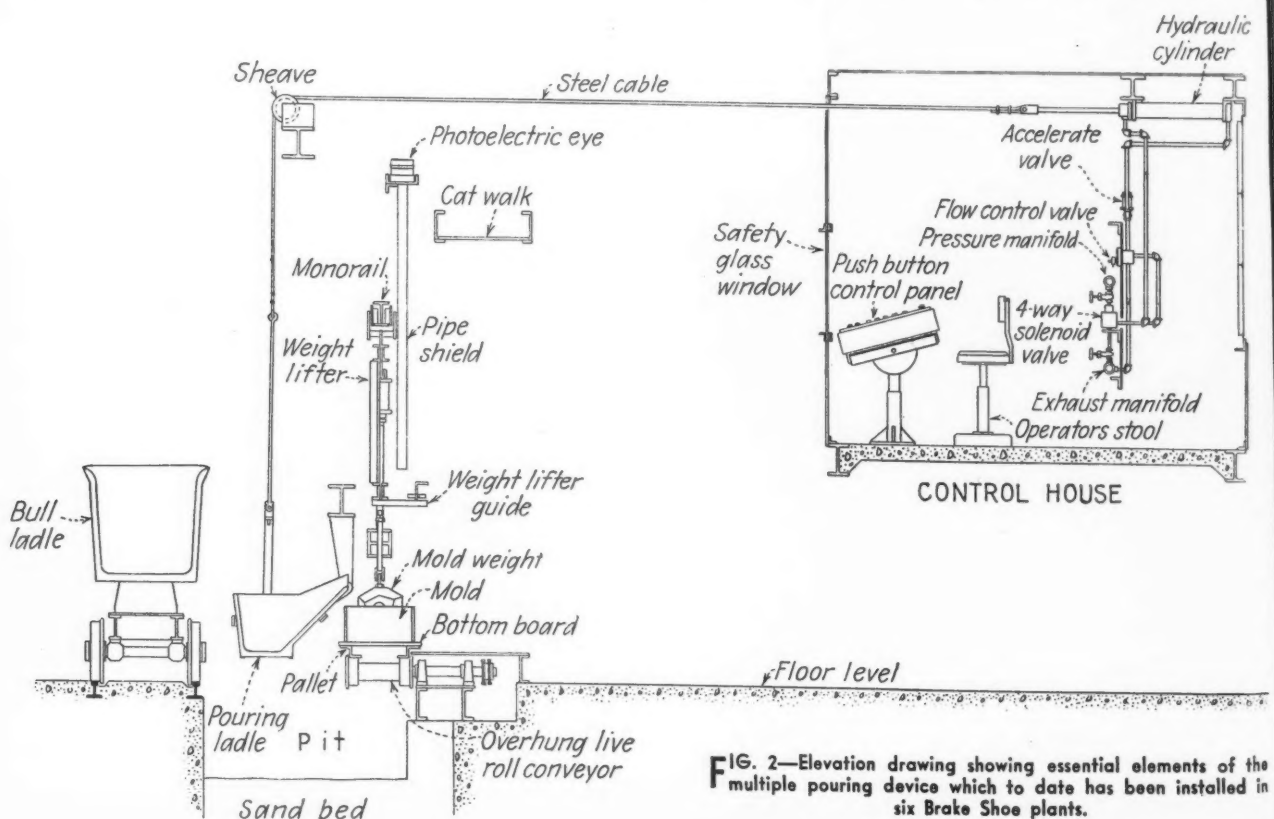


FIG. 2—Elevation drawing showing essential elements of the multiple pouring device which to date has been installed in six Brake Shoe plants.

Pouring is controlled by electric eyes which are focused through pipe shields on the riser of the mold. When the iron raises in the riser, the light intensity of the molten iron actuates the electric eye which in turn stops the pouring.

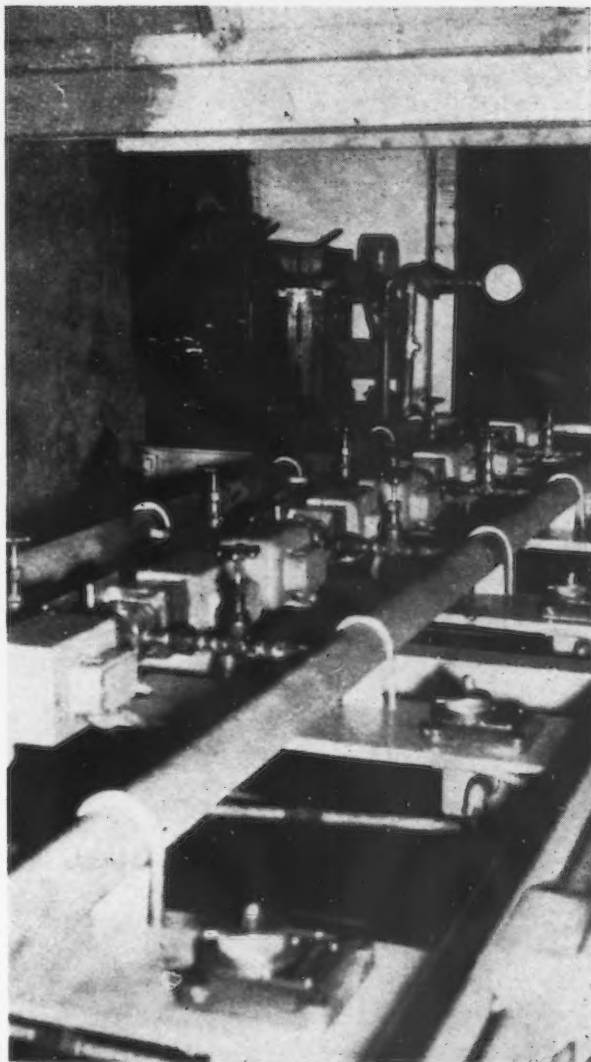
As mentioned before, the ladles are actuated by means of six hydraulic cylinders, the flow of the oil being controlled by electrically operated solenoid valves. The system consists of a hydraulic power unit composed of a motor, hydraulic pump, receiver, relief valve, magnetic separator and pressure gage. This power unit supplies oil under pressure to the pressure manifold. From the pressure manifold six connections are taken for each hydraulic circuit as shown in fig. 2.

Each ladle is actuated by its own hydraulic circuit (see fig. 3). The circuit consists of piping, four-way double solenoid valve with neutral or off position, hydraulic double acting cylinder, flow control valve and a single solenoid operated straightway valve, called the accelerate valve, and used to bypass the flow control valve.

After being filled from the bull ladle, the pouring ladle is brought up to pouring position rapidly. This is done by energizing the four-way valve through pushing the start button and by energizing the accelerate valve by turning the accelerate switch which permits oil to flow from the pressure manifold through the four-way valve to the rod end of the cylinder. Oil from the rear end of the cylinder flows through the accelerate valve to the exhaust manifold.

When the ladle has come to the pouring position, the accelerate switch is turned off and the oil now flows from the rear end of the cylinder through the flow control valve through the four-way control valve to the exhaust manifold. The flow control valve meters out the oil at a rate which may be adjusted to the desired pouring speed.

In instances where certain molds do not take the iron at the set pouring rate, tilting is stopped momentarily by turning a hold switch which puts the four-



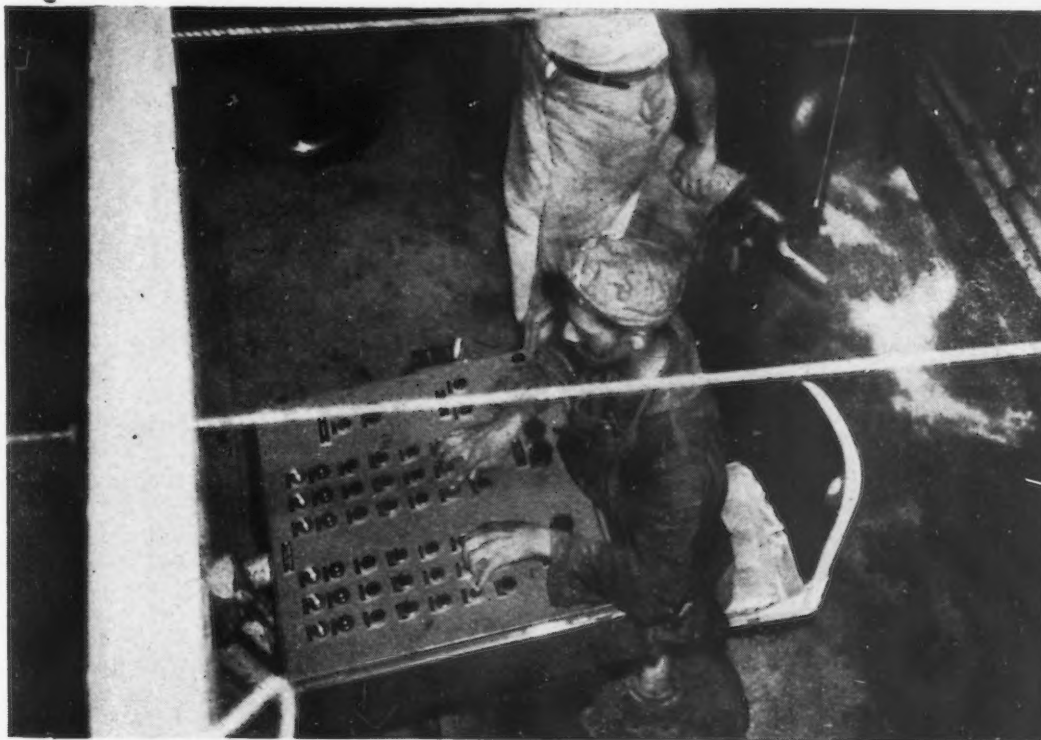
ABOVE RIGHT

FIG. 3—Shown here are the power unit receiver manifolds, four-way valves and flow control valves in the hydraulic circuits actuating the ladles.

o o o

RIGHT

FIG. 4—The operator at the push button control panel controls the entire system.



way valve in a neutral position. This stops the flow of oil. In reality, the metal stream does not actually stop but decreases rapidly by the falling of the head of metal in the ladle. Tilting and pouring is resumed by again turning the hold switch to the off position.

After the mold is filled pouring is stopped by either the electric eye or by manually pushing a stop button. When this is done, an electric time delay relay reverses the hydraulic flow through the four-way control valve for a definite period of time in order to prevent dripping at the ladle lip. Pouring of the next unpoured mold is again resumed by pushing the start button and repeating the above pouring cycle.

When the ladles become empty they are returned to a horizontal position for refilling by pushing a return button which reverses the hydraulic flow.

At the very top of the push button control panel, shown in fig. 4, are two rows of pilot lights divided into six sets for the six ladles. The top lights are red and indicate that the ladles are pouring under manual conditions and that the pouring must be stopped manually with the stop push button. The bottom green

lights indicate that the ladles are pouring under automatic conditions and will be stopped with the electric eye. The third row of push buttons are automatic start buttons which start the ladles pouring under the electric eye control. A single button at the right of the panel is a master button which starts all six ladles under automatic conditions. The fourth row of selector switches permits the acceleration of each ladle, or the master button to the right will accelerate six ladles at once. The fifth row of push buttons consists of hand start buttons and start the ladle pouring under hand conditions, it being necessary to stop the pouring manually with the stop buttons. The sixth row of buttons consists of stop push buttons, while in the last row are hold selector switches for slow pouring. The two buttons to the right in the last row return the ladles in groups of three. The four buttons at the bottom of the panel are forward and reverse buttons for each power conveyor line. Air valves for actuating the weight lifter are located at the bottom and to each side of the panel. The push button panel and wiring equipment were furnished by Square D Co. All relays, etc., are housed in a dust-proof cabinet.

Industrial Truck Handles 30-Ton Load

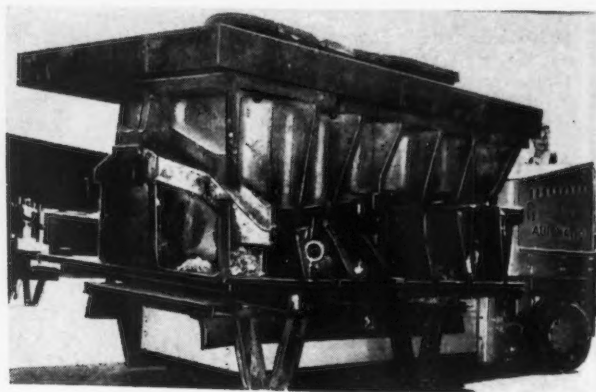
INDUSTRY in the future will be utilizing industrial trucks that will dwarf present sizes, according to B. I. Ulinski, chief engineer, Automatic Div., Automatic Transportation Co., Chicago. Ulinski predicts that the ultimate size of future electric powered industrial trucks will be limited only by industry's material handling problems. Typical of the possibilities of such high capacity industrial trucks are the two giants shown here. Photo at left below shows the largest fork

truck ever built, according to Ulinski. This 15-ton capacity unit, built by Automatic, features an interchangeable ram for handling sheet coils. Plans are said to be underway for building a fork truck for twice the capacity of this unit. The 30-ton capacity low lift platform truck shown in photo at right, a veteran of 10 yr service in a Hudson auto plant, is said to have frequently moved loads as heavy as 54 tons.

FIG. 1—This 15-ton fork truck is said to be the largest unit of this type ever built.



FIG. 2—This low lift platform truck while rated at 30-ton capacity is said to have frequently moved loads as heavy as 54 tons.



Strengthening Metal Parts By Shot Peening

By H. F. MOORE

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University of Illinois and consultant on shot peening,
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The phenomenon of metal fatigue and the effect of shot peening thereon is further considered in this, the second part of a two-part article. The effect of peening on fatigue fractures in regions of high compressive stress is explored in particular detail by the author and comments are given on the offsetting by peening of stress concentrations holes, fillets and notches, and of decarburization. Precautions to observe to obtain optimum results with shot peening are also discussed.

THE commonest cause of fatigue fractures today in machine parts is the stress concentration at sudden changes of form, such as small holes, notches, sharp shoulders, screw threads and keyways. At such stress raisers the applied stress is very high at the edge of the hole, the root of the notch or screw thread, the sharp corner at the bottom of a keyway, or the surface of a shaft near the beginning of a fillet. The stress falls off very rapidly as the distance from the stress raiser increases, as shown in fig. 6. As shown in fig. 6 (Figs. 1 to 5 and tables I to III appeared with part I of this article in the issue of Nov. 28), shot peening near the notch or hole or fillet strengthens the metal in the narrow zone of high stress. The effect of shot peening can reach well below the metal subjected to the peak stress, and thus the fatigue strength of the part is increased. The rate of decrease of localized stress with increase of distance from the stress raiser depends more on the dimensions of the hole, the notch or the fillet than on the over-all size of the part, and hence shot peening may be effective in offsetting stress concentration by stress raisers in large parts. In shot peening grooves, screw threads, notches, fillets and holes it is obviously necessary to use shot smaller in radius than the radius of the hole or the rounded bottom of the screw, thread, notch or fillet.

A rather common source of low resistance of steel to fatigue fracture is the removal of carbon from the surface layer of steel parts, especially parts with the surface left in the as rolled condition. Carbon in this outer layer combines with oxygen during the rolling of the steel, and the removal of carbon weakens this

important surface layer so that fatigue fracture will start at a lower stress or in a shorter time than would be the case if the surface were not decarburized. If a decarburized piece of steel is shot peened the decarburized metal at the surface is strengthened, and the damaging effects of decarburization are at least partially offset. The decarburized layer is usually thin, and in many cases the effect of the shot peening will extend through the decarburized layer, so that peening may be expected to be effective in at least partially offsetting decarburization, even in parts having a large diameter or thickness.

If a machine part is to be subjected to repeated cycles of direct axial tension and/or compression, shot peening is less effective in increasing its fatigue strength than is the case for a part subjected to repeated cycles of bending or of torsion. In a piece subjected to axial tension or compression, up to the yield strength of the core, the applied stress is uniformly distributed over the cross-section, and the bulk of the load must be carried by the unpeened core. At the yield strength of the core, yielding takes place without much additional stress being taken by the core, although some of the stress is transferred from core to peened skin, which has a higher yield strength than the core. However, the area of cross-section of the core is very much greater than that of the cross-section of the peened skin, and the help which the core can get from the peened skin is not very great.

In a machine part under bending or torsion the stress varies from zero at the neutral axis to a maximum at the surface. Then the peened skin of the piece resists a larger proportion of the bending mo-

ment than does an equal area of metal in the core, and adds a larger percentage to the strength of the piece than that added by the peened skin of the piece in direct axial tension or compression.

It has been previously noted that one factor in the strengthening effect of shot peening is the state of residual compressive stress set up in the surface zone of shot peened metal. Then it may well be asked, "How are these residual stresses in the surface zone of shot peened metal affected by subsequent applied stress, especially by thousands of cycles of repeated stress?" Test data on this subject are meager, but a few tests at the University of Illinois³ showed that even a single cycle of applied stress above the yield strength of the peened metal removed the greater part of the longitudinal residual compressive stress. Repeated cycles of applied stress below the yield strength acted much more slowly, and no serious reduction of residual compressive stress was found for applied stresses lower than about one third of the yield strength, even though a million cycles of such stress were applied to the shot peened specimen.

In case of shot peened medium-carbon steel 25 cycles of reversed bending, with an applied stress which caused 0.02 pct permanent set of the metal, removed 76 pct of the residual stress in the skin of the shot peened metal. Under reversed bending stresses of 62.5 pct of the yield strength one million cycles of applied stress removed about 41 pct of the residual stress.

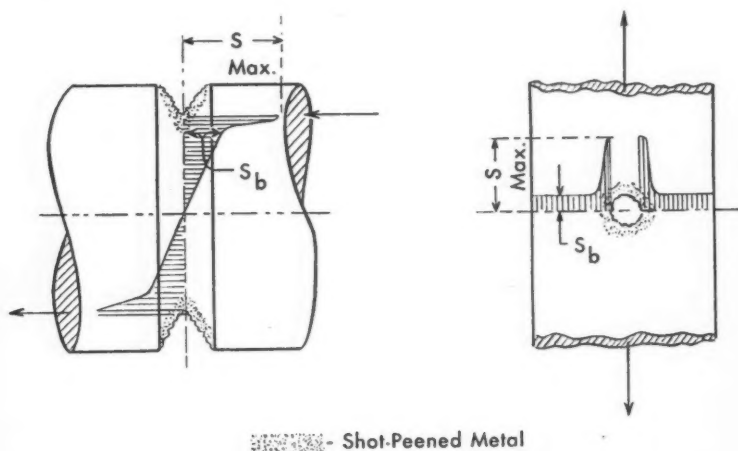


FIG. 6—Shot peening to offset stress concentrations.

In the case of specimens of steel which had been carburized, heat treated and then shot peened, the application of 1,000,000 cycles of reversed bending with an applied stress of 40,000 psi did not appreciably reduce the residual compressive stress in the skin of the metal. Application of cycles of 50,000 psi stress (reversed bending) caused fatigue fracture, but a single cycle of applied reversed stress of 125,000 psi did not appreciably reduce the residual stress.

³ Moore, H. F., "Effect of Repeated Stresses on Residual Stresses in Shot-peening Steels," *Experimental Stress Analysis*, Vol. II, No. I, p. 170 (1944).

The question may be asked, "Why should there be any reduction of residual stress by cycles of stress lower than the yield strength, or at least by cycles of stress below the 'true' elastic limit?" The answer to this question seems to be that the yield strength is reached at such a stress that plastic deformation

has become large enough to do structural damage to the material, and that the existence of any "true" elastic limit for any common structural material is very doubtful. Under any average stress, however low, there are probably localized plastic actions in many isolated crystalline grains of the metal, and under repeated stress there occur microscopic yieldings and a tendency to transfer some stress from locations which have yielded to those which have not, and thus there is a tendency toward a more uniform stress distribution. However, the cumulative action of localized plastic yielding seems to be almost, if not quite, negligible for stresses less than one third the yield strength of the metal.

A few fatigue tests have been made in which specimens developed fatigue cracks in regions of high compressive tests. In one such series of tests the following values of endurance limit of rail steel for 10,000,000 cycles of stress were reported. Recently

Type of Stress	Endurance Limit, psi	Test
Reversed bending	51,000	Rotating beam
Zero to max. tension	72,000	Repeated axial tension
Zero to max. comp.	100,000	Repeated axial comp.
Zero to max. shear stress	57,000	Repeated torsion
Reversed shear stress	30,000	Reversed torsion

several railroads have been reporting a few rail failures by a longitudinal fatigue crack in the fillet under the head of the rail. Strain gage tests showed that the stress cycle under wheel loads in that region consisted of a maximum vertical compressive stress followed by a tensile stress 20 pct as great. These reports suggested an experiment with specimens shot peened in the region of predominant compressive stress. If the simple picture of the beneficial effects of shot peening as wholly or at least mainly due to the off-setting of applied tensile stress by residual compressive stress set up by shot peening is a complete picture, then shot peening of surfaces to be subjected to compressive stress, with diagonal shearing stress accompanying it would seem to add residual stress and applied stress, both compressive and shearing and weaken the specimen.

Two series of fatigue tests of specimens cut from a railroad rail were made at the University of Illinois.⁴ The cycle of longitudinal stress in the specimens was from a maximum compressive stress to a tensile stress 20 pct as great. The specimen was T shaped

⁴ Jensen, R. S., and Moore, H. F., "Fatigue Tests of Rail Steel under Compressive Stress," 1946 ASTM Convention.

in cross section with the stem of the T taking the maximum compressive stress. One set of test specimens was shot peened on their upper and lower faces, and the other set of specimens was unpeened. Fatigue cracks developed from the point of maximum computed compressive stress in both series of tests, but the peened specimens showed fatigue strength 22 pct greater than the unpeened specimens. In the region of compressive stress the cracks spread much more slowly than do fatigue cracks in regions of tensile

stress, and more stress was required to start fatigue cracks in the region of dominant compressive stress. The outstanding result of the tests was that shot peening did strengthen a specimen under cycles of dominant compressive strength, and that it was found that fatigue cracks could be started on the "compression" side of a beam under flexure, if the stresses on the tension side could be kept down to about half the stresses on the compression side, as may be the case of a T shaped beam with the flange in tension.

Recently a test has been made on a T section specimen cut from the same rail. In this test the cycle of stress at the compression edge of the T ranged from 2000 psi compression to 100,000 psi compression. After about 150,000 cycles of stress a crack was detected in the upper edge of the T section where the applied compressive stress was greatest. The crack slowly spread toward the flange, but after 875,000 cycles of stress had not quite reached the flange.

Now it seems incredible that cracks should be started by a compressive stress, and today most metallurgists hold that they are not so started. In any region of dominant compressive applied stress there is also applied shearing stress in a diagonal direction and equal in magnitude to about half the longitudinal compressive stress. If these shearing stresses are large enough and repeated a sufficient number of times they start a slipping within certain crystalline grains and along certain atomic planes in the grain. This slipping distorts and misaligns these atomic planes and may slightly rotate some crystalline grains. Such distortion and misalignment is pictured as causing minute hollows and humps irregularly spaced over the slipping planes, and this causes resistance to slip and sets up many stresses, some compressive, some tensile, some shearing around these humps and hollows and perhaps at the edges of the rotated grains.

Such stresses cannot be computed by any elastic theory, nor measured by any available strain gage. They are micro stresses, and if the applied stresses (which can be computed) increase these micro stresses tend to increase also, although no quantitative relation is known between micro and macro (applied) stresses. However, it seems reasonable to picture the beginning of a crack to be due to micro tensile stresses in the immediate vicinity of a region of slip in the general direction of the shearing stress which is causing that slip, and, at the start following the direction of the plane of slip. The slip then is pictured as due to applied shearing stress, but the crack is started by micro tensile stresses in the immediate vicinity of the plane of slip.

Once the crack is fairly started it becomes an effective stress raiser for any applied stress at the end of the crack. It is difficult to imagine compressive, applied stresses, stresses spreading the crack; it is not difficult to picture applied shearing stresses spreading the crack, and it is very easy to picture applied tensile stresses spreading the crack.

Fig. 7 (a) shows in diagram the spread of a crack from the compression edge of a T section bending

specimen vibrated with a constant range of deflection. At *O* a compressive strain *c* is set up on the edge of the specimen. The stress-strain diagram for the metal at the region immediately around *P* is *OA* causing a slight plastic action as shown by the curvature of *OA*. Now when compressive strain is released to *D* the compressive stress is reduced to zero. Then when the cycle of stress, which ranges from zero to the compressive stress *C*, is completed at *O* there is a tensile strain and a tensile stress *T* in the metal at point *P*. Under successive cycles of stress values of *C*, the magnitude of *c*, *t* and *T* change somewhat, but the initial cycle of applied stress from zero to maxi-

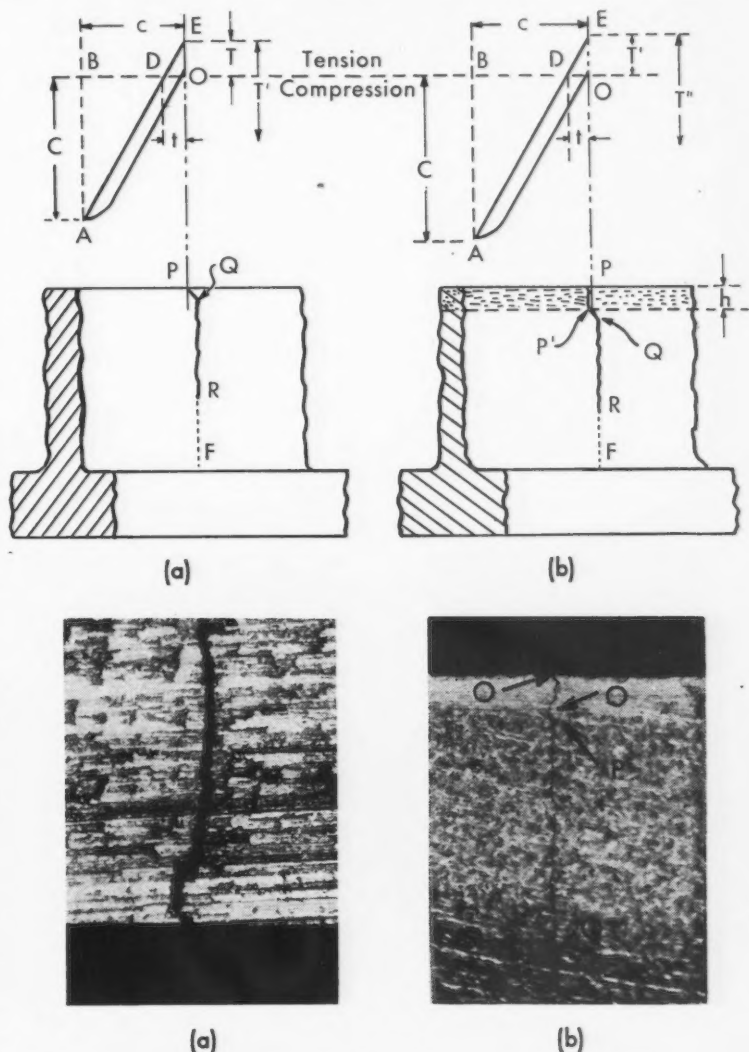


FIG. 7—The start of a fatigue crack at a compression surface and its spread below that surface. X85. Photo by C. W. Dollins.

mum compression is changed to a cycle of stress ranging from small tensile stresses to relatively large compressive stresses. The small tensile stresses are not sufficient to start a crack. However, along with the compressive stress *C* the metal at *P* is subjected to a diagonal shearing stress, starts slip along a diagonal plane *PQ*, causes distortion and misalignment of that plane, restricts further slip, presumably causes a multitude of micro stresses to be set up in the distorted planes of slip. Some of these micro stresses are tensile stresses with components in the plan of slip, and may open minute cracks. Supposing this to have hap-

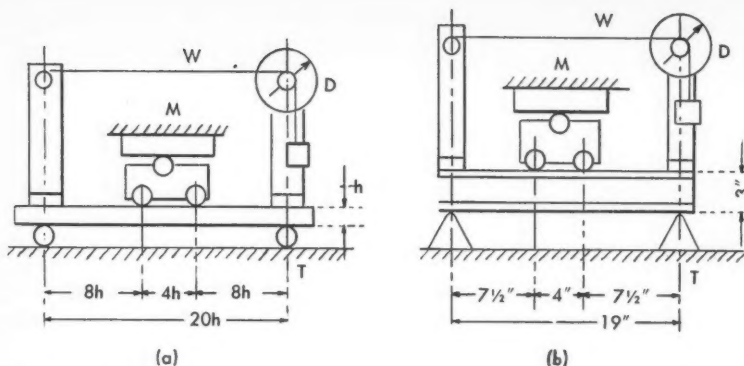


FIG. 8—Testing rig for static flexure test of shot peened bars and I beams.

pened, then these minute cracks will act as stress raisers, intensifying the tensile stress T and increasing it from a stress too small to start a vertical crack into an intensified stress T capable of doing so. Then a crack spreads in the direction QR . The length of the initial shear crack PQ may be only a few thousandths of an inch, even then it may be an effective stress raiser.

Under the cycles of constant deflection as the cracks spread in the direction QR the strain c tends to become less, but the stress concentration at the end of the deepening crack becomes greater. Probably the

net result is to slow up the progress of the crack somewhat, and when the crack reaches F it may become very slow, or possibly may stop. During the tests of T section specimens at the University of Illinois even 10,000,000 cycles of stress failed to spread any crack below the upper edge of the flange at F .

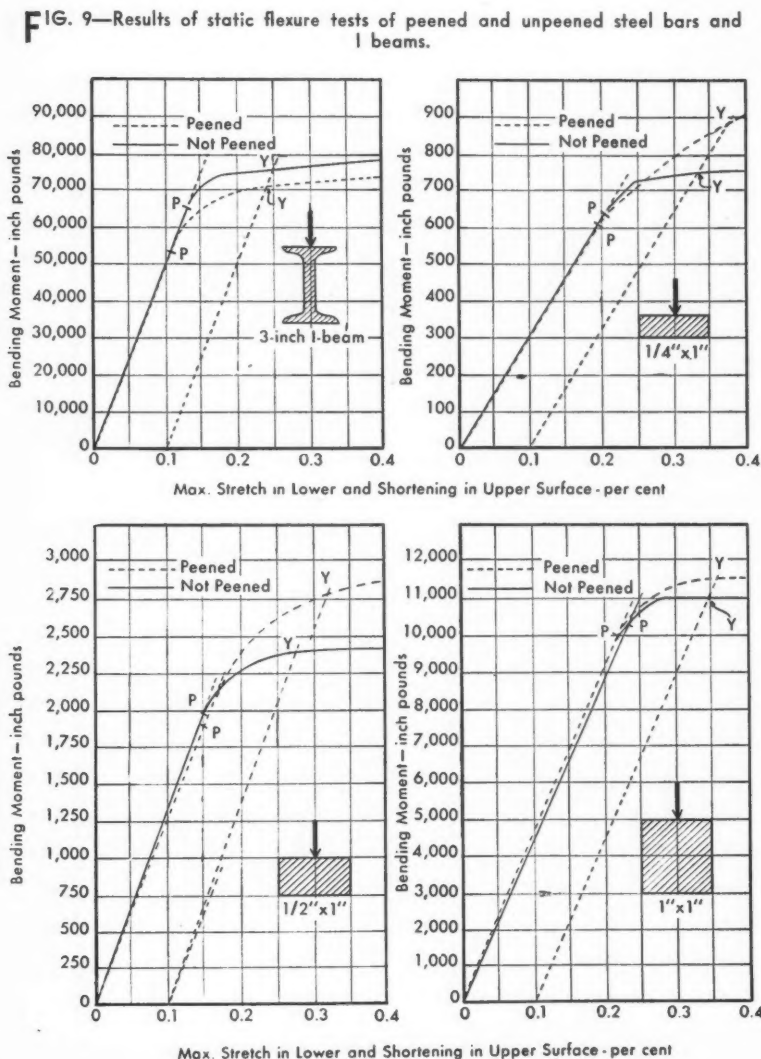
Considering the shot peened specimen shown in fig. 7 (b) the same plan may be followed as for fig. 7 (a), except that the initial shear crack will probably start at P' in the region between the shot peened surface zone and the base metal. The shot peening strengthens the specimen principally because the shot peened metal is stronger in shearing strength than the unpeened metal, and a higher stress T' is necessary before the accompanying (and proportional) shearing stress has sufficiently distorted the structure of the metal along the slip planes to set up micro tensile stresses large enough to start a crack at P' which shall intensify the small tensile stresses at the end of a cycle of stress so that a crack will spread.

Fig. 7 (c) shows a photograph of a crack in an unpeened specimen subjected to cycles ranging from a small compressive stress to a large compressive stress, and fig. 7 (d) shows a typical crack in a shot peened specimen subjected to cycles ranging from a small tensile stress to a large compressive stress. In both these photographs may be seen some evidence of a very short diagonal crack corresponding to PQ in fig. 7 (a) and to $P'Q$ in fig. 7 (b).

The most important use of shot peening for strengthening metals is its use to increase resistance to fatigue fractures under repeated stress. However, it does have some effect on static strength and static flexure tests of structural steel peened and unpeened were recently made at the University of Illinois. These tests gave some interesting results on the effect of shot peening on elastic strength and effect of size of specimen.

Static flexure tests were made on flat bars of structural steel (about the same as SAE 1020 steel). Three sizes of bar were tested with cross sections of $1/4 \times 1$ in., $1/2 \times 1$ in., and 1×1 in., respectively. All pieces of each size bar were cut from the same stock bar. Load was measured in an ordinary testing machine, and deflection was measured as shown in fig. 8 (a). For each size of bar two specimens were tested with upper and lower faces peened, and two were tested unpeened. A length of a light 3-in. I beam as shown in fig. 8 (b) was tested with top and bottom flange faces peened, and a companion specimen cut from the same stock bar was tested unpeened.

Fig. 9 shows the results of the static bending tests. It will be noted that in all the tests the first appreciable indication of inelastic action, shown at P by appreciable deviation of the moment-strain curves from a straight line was observed in the peened bars. That is, plastic action seems to have started at a lower stress in the peened



bars than in the unpeened. However, the metal which was cold worked by peening showed greater stiffness in the plastic range than did the unpeened metal, and in the case of the three rectangular bars under load beyond the first noticeable deviation from Hooke's Law the peened bars soon surpassed the unpeened in resistance to yielding. The permanent deformation, or set in a specimen may be taken as approximately equal to the offset of the moment-strain curve from the initial straight line of that curve. Taking then a permanent set of 0.1 pct as an index the effect of shot peening was most marked in the $\frac{1}{4} \times 1$ in. bars, about the same in the $\frac{1}{2} \times 1$ in. bars, and very slight in the 1×1 in. bars. The 3 in. I beams showed a slight advantage for the unpeened bars at 0.1 pct permanent set.

The falling off of the gain in yield strength of peened specimens as size of cross section increases is a size effect which seems to indicate a distinct limitation of the use of shot peening to increase the yield strength of large structural shapes, such as are used for beams and columns. It seems that shot peening might be quite effective in increasing the yield strength of sheet metal and plate metal up to $\frac{1}{2}$ in. thick, and of small machine parts. Probably the yield strength in torsion of small shafts might also be improved.

Obtaining Optimum Results

Overpeening may weaken metal by so stretching the surface that its ductility is exhausted and a crack is formed. This is very likely to start a spreading fatigue fracture under abnormally low stress. However, overpeening is a rather rare occurrence. During peening, a number of the shot are broken, and if they are not removed before being carried back into the feed hopper, they will be used over and over again, and their number will increase. Broken shot have less mass than the unbroken shot and since they hit the surface of the piece at about the same velocity, they do not do their share in the peening process. The effectiveness of the peening operation is thereby impaired by the presence of broken shot, and therefore the broken shot should be removed as quickly as possible.

One caution is given as to stress concentration due to notches caused by shot peening. Fig. 10 (a) shows thin fins of shot peened steel pushed out at the corners of a sharp-cornered rectangular bar. These fins have jagged edges as shown in the side view (fig. 10 (b)), edges so jagged and with notches so sharp at the bottom that, even with multiple notches along the edge, the stress concentration and the tensile stress set up under the pushed out fins may be severe enough to offset completely the advantages of increased strength of metal and of the thin skin of surface metal under compressive stress. Fig. 10 (c) and (d) shows how these sharp fins may be avoided by chamfering the edges of a rectangular bar or plate before peening it. Fatigue tests at the University of Illinois showed very clearly the damaging effect of sharp fins at the edges of a piece of metal.

The size and the velocity of the shot for optimum results in any job of shot peening is, as yet, dependent on experience, developed judgment, study of results in service and fatigue and static tests of specimens, or better full size parts. An analysis of the control

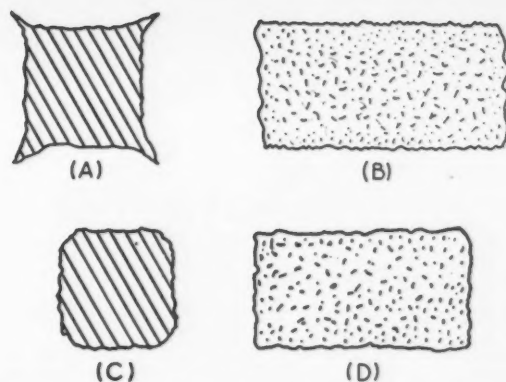


FIG. 10—Stress raising fins on shot peened steel bar; (a) cross section of rectangular bar with sharp edges; fins form under shot peening; (b) side view of rectangular bar with sharp edges; (c) cross section of rectangular bar with chamfered edges; fins do not form, and (d) side view of rectangular bar with chamfered edges.

of the shot blast can be obtained by the use of the Almen gage and test strips. A uniform shot blast is necessary to secure a uniformly peened surface.

Limitations of Shot Peening

Shot peening is not very effective in increasing the resistance to repeated stress of parts subjected to cycles of direct tension-compression load. Metal may be weakened by too high an intensity of shot peening. Much has yet to be learned about the details of the peening process before any very definite rules can be laid down for securing optimum results for a given machine part. The thickness of the shot peened skin on a machine or structural part is probably not over a few hundredths of an inch for small pieces, although it may be somewhat larger for large pieces peened with large shot with a high striking velocity. This means that shot peening cannot be expected to be so effective in increasing the fatigue strength or the yield strength of thick pieces free from stress raisers as it has been found to be in the case of thin pieces. If there are cracks or seams in the base metal peening may not be effective.

Shot peening can be applied to parts of irregular shape in which heat treatment might cause excessive distortion, and in which rolling or drawing processes are not feasible. Shot peening can be applied to finished parts, such as springs, or to specific areas on structural or machine parts, as when shot peening is applied to the fillet of a shaft to offset stress concentration. It can be used to increase the yield strength of sheet metal and thin plate metal. It can be applied to parts such as gear teeth without causing appreciable distortion where it renders the surface more resistant to wear. Shot peening is commonly the last operation on finished gear teeth because it does not produce appreciable distortion. Often shot peening can be used as a surface finish in place of polishing, with actual gain in fatigue strength. Such a substitution of shot peening often reduces production costs materially. Shot peening can be used to give still greater fatigue strength to carburized parts and parts made of heat treated alloy steel or in some cases economy and safety may both be obtained by designing parts to be made of heat treated alloy steel,

or in some cases economy and safety may both be obtained by designing parts to be made of shot peened medium-strength low-cost steel rather than of high-strength high-cost alloy steel.

Acknowledgment

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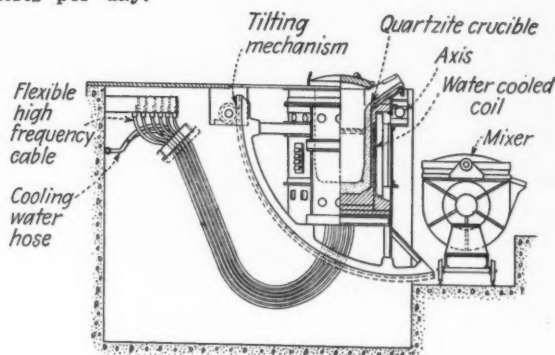
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Swedish High Frequency Furnace for Cast Iron

BECAUSE of the fuel shortage experienced in Sweden during the war, the SKF Works installed a high frequency melting furnace for the production of high-strength cast iron. This furnace, which went into operation in July 1943, is described in *Engineers' Digest*, New York, September 1946. Normal furnace capacity is 5.5 tons, but charges of 6 tons can be dealt with, although with a higher power consumption per ton of charge. The tilting mechanism and other features are shown in the accompanying illustration.

The furnace coil consists of water cooled copper tubing insulated by means of a high heat resistant ceramic material. Magnetic screening of the coil is effected by a laminated sheet metal casing, which also serves to support the coil. The cooling water consumption amounts to about 60 gal per min. In order to preclude the possibility of condensation of atmospheric moisture upon the cooling coil, the admission temperature of the cooling water is kept constant at 95°F. A portion of the cooling water which is discharged at 122°F, is mixed with the cold supply water to maintain the inlet temperature of 95°F.

The motor-generator set consists of a three-phase induction motor of 1850 hp, coupled with a generator delivering 1250 kw at 2500 v and a frequency of 743 cycles. An automatically controlled static condenser maintains the power factor as near unity as possible. Both the condenser and the motor generator set are air cooled. Furnace output averages 2 tons of molten metal per hour, about 33 tons being produced in two shifts per day.



Fuel Studied with High Speed Camera

HIGHSPEED pictures taken at the rate of 40,000 to 200,000 frames per second were used by C. D. Miller of the National Advisory Committee for Aeronautics, Aircraft Engine Research Laboratory, Cleveland, to show the results of seven yr of research on the subject of gasoline engine spark knock to the Detroit Section of the Society of Automotive Engineers.

As interpreted by Mr. Miller, these pictures support

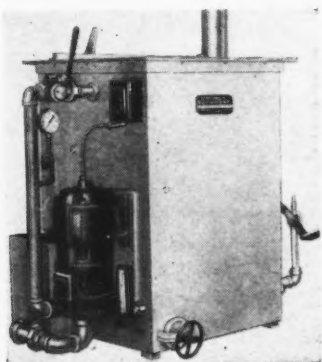
a new theory of knocking noises in a gasoline engine, attributing this phenomena, in different cases, to self-ignition of the fuel, detonation waves or both. The ultrahighspeed at which these pictures were taken may be appreciated from the fact that the rate is so fast that if a jet plane were the subject of the photography it would require 45 min to fly its own length on the screen.

New Equipment...

Cleaning and Finishing

Recent developments in dip-agitating, spray and continuous type parts cleaning machines, electroplating units, spray guns, electropolishers and other cleaning and finishing equipment, together with materials such as rust removers and preventives, degreasers, and various coatings are described in this week's review.

TO ELIMINATE slow hand-cleaning of small metal parts, a spray type washing machine for quick washing of parts on racks has been announced by the *Optimus Equipment Co.*, 137 Church St., Matawan, N. J. This machine can be placed directly on the floor, no pit or cement work are necessary. The top of the unit is at working height and the spray is started by a lever operated valve. Spray nozzles are adjustable and replaceable. The machine can be used with submerged agitation to remove caked greases. It can be used



individually, or in series where the washing operation requires several steps, for example, solvent wash, rinse, alkali wash, and second rinse.

Steam Cleaning Detergent

DESIGNED for use in modern steam guns and coil-type steam-generating mechanisms, a heavy duty alkaline type detergent has been announced by *Oakite Products, Inc.*, 30H Thames St., New York 6. This high-speed detergent, called *Oakite Composition No. 92* is said to provide reductions in time and cost allocations for such jobs as cleaning machinery and equipment parts for subsequent repair and overhaul, preparing

equipment surfaces for repainting and refinishing, cleaning equipment too large for tank immersion, and paint stripping operations. The detergent gives thorough and fast steam cleaning action at very low concentrations, it is said, and prevents scale clogs in steam coils. It readily dissolves in hot water, has free-rinsing action on all surfaces and is safe to handle without offensive fumes or toxic vapors.

Rust Remover

DEVELOPED to wet metal thoroughly, dissolve rust scale rapidly, remove it completely, and be relatively noncorrosive to steel even under conditions of long exposure, a rust remover has been perfected by the *Nox-Rust Chemical Corp.*, Chicago 8. It is claimed this remover does not affect critical dimensions when removing rust from precision bearings and machined surfaces. Tests on highly polished roller bearings weighed to 0.0001 g accuracy showed weight losses of less than 1/20th of 1 pct even after 8 hr immersion. Ordinary rust removal takes only a matter of seconds, however, leaving no perceptible etching or discoloration of surfaces.

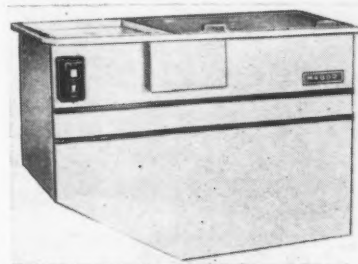
Pickle Inhibitor

FOR use as an inhibitor in sulfuric acid pickling solutions, *Oakite Pickle Control No. 3* has been developed by *Oakite Products, Inc.*, 30H Thames St., New York 6. A yellowish-brown, free-flowing powder with a density half that of water, the new material was designed primarily for inhibiting hot sulfuric acid pickling solutions, but may also be used in mixed sulfuric-hydrochloric baths in which sulfuric acid predominates. Applications cover pickling many types

of ferrous alloys and castings, hot and cold-rolled steel, also pickling prior to plating or phosphate coating or where zinc coatings are stripped. *Pickle Control No. 3* is claimed to improve and economize the pickling cycle. Savings in metal, acid and maintenance costs have been reported, together with reduction in fuming, hydrogen embrittlement, pitting and discoloration of work. By retarding the build-up of iron sulphate in solution, the inhibitor is said to minimize the frequency and cost of spent liquor disposal.

Dip-Agitating Machine

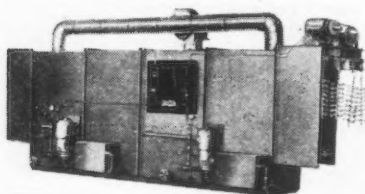
A DIP-AGITATING machine for cleaning parts where a swishing action gives adequate



cleaning results, has been developed by the *Mabor Co.*, Rahway, N. J. The drive mechanism mounted in a removable frame utilizes only two bearings, and balances the weight of the parts by means of a knee which rests next to the bottom of the equipment, outside of the tank. It does not impose stress on any part of the machine, it is said, even when fully loaded. The dip-agitating method is said to avoid pump difficulties with solutions mixed with dirt, grit, and other impurities. The machine is built in various sizes, for wash and rinse, and can be heated with steam, gas, oil, or electricity.

Metal Washing Machine

WITH output rated at 60 racks per hr, a continuous type washing machine for handling large numbers of metal parts on racks, before plating, painting or any similar process, has been introduced by the *Optimus Equipment Co.*, 137 Church St., Matawan, N. J. It will handle any type of parts provided they are free-draining, and the sprays have free access to the parts. The machine can be used as a single stage washer, or it can handle a number of successive operations—alkaline, acid, or neutral. With slight alterations, the machine can take care of a series of different operations, such as washing, rinsing, drying, pickling, cyanide treatment, etc. However, its greatest use is for the cleaning of buffing compositions after buffing and before plating. The machine is closed when in operation, but may be con-



nected to an exhaust blower so that fumes, unpleasant odors or excessive heat are not developed. It can be heated by steam, gas or electricity. A number of manifolds with spraying nozzles are mounted on all sides of the washing chamber. Solution circulation system includes a pump, piping, series of filters and strainers to filter the solution. The conveyor is an overhead chain type.

Rust Preventive

DESIGNED for protecting metals for short periods before they are painted, enameled or between machine operations, a rust preventing agent, known as Pennsalt RI-50, has been announced by the *Pennsylvania Salt Mfg. Co.*, 1337 Chestnut St., Philadelphia. The product is an inorganic salt mixture and is used as a water solution with a concentration of 2 to 4 pct RI-50. It is packaged in 25, 100 and 300-lb drums.

Hot Tank Cleaner

MARKETED under the name of Ferrex, a low-cost, noninflammable hot tank cleaner has been introduced by *Turco Prod-*

ucts, Inc., 6135 South Central Ave., Los Angeles. It is said to remove effectively carbon and paint, as well as grime, grease, gums, heat-hardened resins and heavy dirt, from steel and other ferrous metals without the necessity of scraping and other manual methods. Ferrex utilizes a water solution and a simple hot tank, preferably with air agitation, to penetrate and wet out carbon smut and lead deposits, emulsify petroleum residues and saponify animal and vegetable oils. The solution may be used over and over with little depletion of strength. Since Ferrex contains no inert ingredients, wastage is eliminated through the use of every particle of the cleaner.

Self-Emulsifying Solvent

A SELF-EMULSIFYING, water-mixable solvent, called Oakite Composition No. 98, that removes light shop dirt and non-pigmented stamping compounds from steel and aluminum work, has been made available by *Oakite Products, Inc.*, 30H Thames St., New York 6, for use primarily in pressure-spray washing machines. Non-toxic, nonflammable in solution, the new material is reported to have important self-cleaning properties and employs the principle of constant-float protection. The lighter-than-solution soil floats at the top of the cleaning tank to blanket and protect the clean solution underneath, retard foaming, and prevent material loss by evaporation. The floating layer is periodically skimmed or caused to overflow to avoid excessive thickening. The solvent also prevents formation on clean work of water spots, which often show through clear lacquer and other types of organic finishes. Practical working concentrations for Composition No. 98 range from 1 to 2 pct by volume, and maximum temperatures should not exceed 150°F.

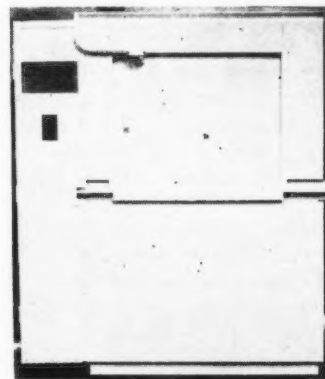
Metal Cleaners

ANNOUNCEMENT of cleaner A-22 for aluminum alloys and PM-95, an acid base cleaning and descaling compound, has been made by the *Pennsylvania Salt Mfg. Co.*, 1337 Chestnut St., Philadelphia 7. Cleaner A-22 is a general purpose soak tank cleaner for use on all aluminum alloys. Most common applications are cleaning aluminum before anodizing, chromodizing, phosphatizing and other prepaint-

ing treatment and before deoxidizing and subsequent spot welding. PM-95 is a specially prepared cleaning and descaling compound containing additional agents for surface action and inhibition. Suggested uses are general pickling and metal descaling, especially for difficult-to-remove oxides resulting from heat treating or annealing.

Washing Machine

ADAPTABLE to a variety of metal washing purposes is the cabinet type industrial washing machine manufactured by the *Industrial Washing Machine Corp.*, New Brunswick, N. J. It is said to quickly, efficiently and thoroughly wash and rinse gears, tools, and assorted parts up to 36 in. in diam



and 30 in. high. Designated as RBM, it is compactly designed to conserve shop space and is completely automatic in operation, thus eliminating the necessity of constant attendance.

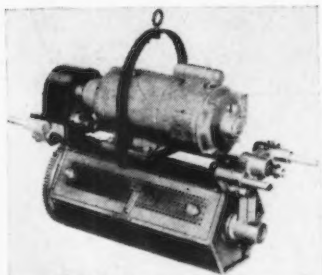
One-Dip Degreaser

CALLED the 1 DC-750, a standard conveyorized one-dip concentrator has been introduced by the *Detrex Corp.*, 14331 Woodrow Wilson, Detroit 32, to degrease small miscellaneous screw machine parts. The unit is small and compact and suited to small shops as it occupies less than 75 sq ft of floor space. Its height is 9 ft 9 in. The machine may be supplied with rotary baskets, 10 in. diam x 20 in. long or a combination of rotary and flat baskets. Work to be cleaned is loaded at one end of the degreaser, carried through the cleaning cycle, and is returned to the same end of the machine for unloading. The conveyor system is complete with sprockets, shafts, take-up device, speed reducer and variable speed drive.

NEW EQUIPMENT

Portable Plating Barrel

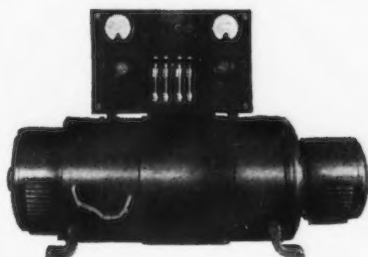
DEVELOPMENT of a plating barrel, known as the Mercil portable barrel unit, has been announced by the *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. The unit, designed for small quantities of work, can be furnished with steel cylinder for cleaning,



with a Monel cylinder for pickling, or with a rubber or Bakelite cylinder for plating. The cleaning or pickling cylinder is 8 in. in diam x 18 in. long and is driven by a special Janette motor-reducer, at 1.6 rpm. The unit with steel cylinder can also be used for tanks containing solution for black oxide finishes. The plating unit has chain dangle contacts and can be equipped with a cylinder 6 in. in diam x 12 in. long or 8 x 18 in. Cylinder speeds of 5 to 6 rpm can be secured. A cylinder 6 x 12 in. will hold approximately 2 qt.

Electroplating Generators

SIX models comprise a line of low voltage electroplating generators announced by the *Motor Generator Corp.*, Troy, Ohio. Sizes range from 100 to 2000 amp at 6 v or 1000 amp at 12 v. Illustrated is the No. 130 model which is rated 1000 amp at 6 v or 500 amp at 12 v.



The generator is driven by a 10 hp motor at 1200 rpm. This model serves the job shop and manufacturer where still plating tanks are used for nickel, copper, brass or cadmium. The standard tank size used with this model is 6 ft x 30 in. x 30 in., or a tank containing

about 250 gal of solution. For chromium plating, individual 1000 amp, 60 v generators are used right at the tank. With this double commutator machine, the commutators can be connected in series to get 12 v or less for barrel plating, electrocleaning, etc. Another feature is separate excitation of the generator fields, which is said to insure better plating characteristics.

Rhodium Plating

DEVELOPMENT of rhodium plating of an improved quality has been announced by *P. R. Mallory & Co., Inc.*, Indianapolis 6. It is said to be possible to obtain unusually heavy deposits, with the desirable hardness, brilliance and corrosion resistance inherent in metallic rhodium. At the same time, the improved process assures freedom from shadows, pin holes and blisters which normally accompany heavier coatings, it is claimed. Perfection of this process provides an enlarged field for this metal in both the jewelry and industrial fields.

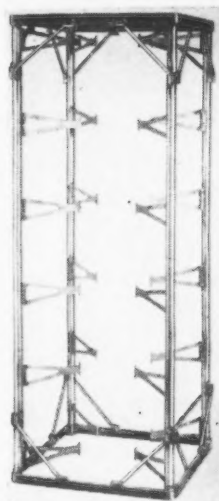
Plastic Coating

AAVAILABLE from *Standard Associates, Inc.*, Katonah, N. Y., is a clear plastic compound developed for protective sealing against oxidation and corrosion of metal products, as well as mechanical or electrical equipment. It is applied at ambient temperatures by brushing, spraying or dipping, dries in less than one hour, has low moisture transmission rate and high dielectric strength. The plastic may be stripped off manually without the use of solvents or abrasives, leaving the coated surfaces in their original state of preservation and cleanliness. It may be applied in thicknesses from 0.001 to 0.015 in., is water clear or tinted. During manufacturing operations this plastic is suitable for paint masking, protection of highly polished surfaces during machining and assembly operations, and other applications where a protective coating is required.

Enameling Fixture

THOROUGH circulation of heated atmosphere is provided by a lightweight fixture for handling dished tank heads for hot water heaters through porcelain enameling furnaces. The fixture which has been designed by the *Stanwood*

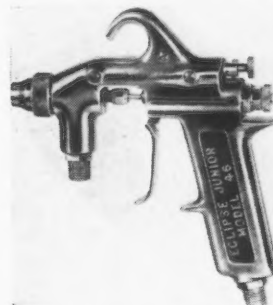
Corp., 4819 W. Cortland St., Chicago 39, holds six tank heads, each of which is supported at only four points, permitting thorough circulation for complete heating of all surfaces. Tank heads can be in-



serted from any side. The fixture which is of welded construction is reversible for double duty service.

Spray Gun

KKNOWN as the Junior Model 46, a low pressure spray gun designed for light products-finishing operations and for use where a limited volume and pressure of air are available, has been announced by *Eclipse Air Brush Co.*, 414 Park Ave., Newark 7, N. J. Junior Model 46 can be used with both internal and external types of nozzles. Both fluid and air connections are standard 1/4-in. pipe. The spray pat-



tern with an external nozzle can be controlled from a cone to a fan by adjusting the air valve on the back of the gun.

Spray Booth Compound

CALLED TRIAD PR, a protective coating for spray booth side walls has been announced by the *Detrex Corp.*, Detroit 3. Ap-

plied to the side walls of either wet or dry spray booths with brush or spray gun, it provides a light-reflective finish that withstands mild abrasion. Its white brilliant surface is said to improve visibility in the booth and is easily flushed off either with water or steam. PR is said to aid also in the speedy stripping of paint from conveyor hooks and spray booth louvers. TRIAD WSF, a water conditioner for use in the water of wet spray booths, is also manufactured by Detrex. WSF removes the adhesive qualities from all types of paint and prevents the fouling or clogging of lines, pumps, nozzles and other spray booth working parts by accumulated paint overspray.

Spray Booth Coating

WASTE paint can be stripped from spray booth walls in sheets with no scraping necessary, it is said, by spray coating the booths with Boothcote, before the spray-painting begins. This protective coating is manufactured by the *Harris Soap Div., Hygrade Food Products Corp.*, Buffalo 6. Boothcote is noninflammable, can be applied with any standard spray gun or can be brushed on. It does not dry out, it is claimed, and after long periods of time it still remains effective. The coating comes ready mixed and is effective with all types of finishes including varnish, shellac, lacquer, enamel, stains and paints.

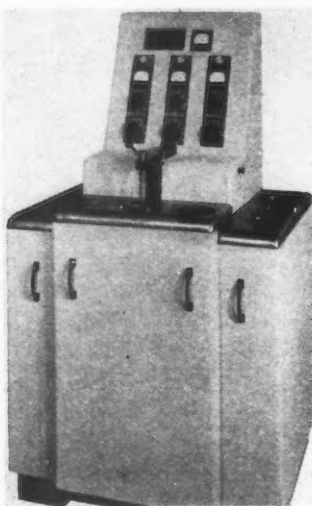
Rack Coating

KKNOWN as Miccotex, an air-dry rack coating developed specifically to overcome the difficulties commonly found in applying lacquers has been announced by the *Michigan Chrome & Chemical Co.*, 6340 East Jefferson Ave., Detroit 7. This coating is a thermoplastic insulating material which is said to meet the requirements of all plating, anodizing, tannerizing, parkerizing, and bonderizing cycles. Miccotex is tough, resilient and flexible and overcomes the difficulties commonly found in lacquers which have a tendency to become brittle with use, causing seepage under the coating and then peeling. It attains maximum adhesion without depending upon shrinkage. It is a black material with a high luster, unaffected by any solution commonly used in plating and anodizing cycles, including the electroly-

tic sulfuric acid strip used to dissolve bright nickel, and alkaline cleaners at boiling temperatures.

Electropolisher

FOR polishing and etching metallurgical specimens, the Cenco-Hangosky electropolisher has been developed by the *Central Scientific Co.*, 1700 Irving Park Rd., Chicago 13. Polished and etched samples can be prepared for microscopic examination, from such substances as carbon steels, stainless steels, cast irons, nickel and nickel alloys, bearing metals, copper, brass,



aluminum, zinc, cadmium and many other metals and alloys; inclusions are retained and may be identified. The apparatus is housed in a metal cabinet with inclined control panel containing knobs and meters for control of polishing and etching time and current. A water fountain is provided for cooling and washing the sample and connections are made to city water and drain pipes. The unit requires either 115 or 230 v, 60 cycle ac. The maximum power requirement is 3 kva.

Insulating Varnish

KKNOWN as Harvel 912C, an internal-curing insulating varnish which is claimed to cut curing time up to 50 pct, yet involves no change in curing equipment, has been added to the series of phenol-aldehyde varnishes produced by *Irvington Varnish & Insulator Co.*, Irvington, N. J. Typical operational curing schedule of 912C in standard convection ovens, based on actual coil curing, is 2 to 4 hr at 285° F, 3 to 5 hr at 260° F, and 4

to 6 hr at 250° F. These schedules vary slightly with coil size and iron mass, and the periods can be reduced with the use of infra-red equipment.

Coating Thickness Gage

KKNOWN as the Filmeter, NRL Model 1, an electronic instrument for measuring, rapidly and nondestructively, it is said, the thickness of paint, varnish, lacquer, ceramics, plastics, and other non-conducting coatings has been announced by the *American Instrument Co.*, Silver Spring, Md. Coatings which may be deposited on nonmagnetic base metals such as aluminum, brass, copper, bronze, etc., can be measured from 0 to 0.005 in. thickness, with an accuracy of 3 pct of full scale. Measurements may be made on any flat surface, or on convex or concave surfaces having a radius of curvature of not less than 6 in.

Silicone Resin

ATHERMOSETTING silicone resin has been developed by the *Dow Corning Corp.*, P. O. Box 592, Midland, Mich., for use in formulating exceptionally heat and moisture resistant paints having a hard, mar-resistant surface. This new resin, known as DC 804, is especially indicated for use in formulating white finishes having properties between those of ceramic coatings and ordinary organic paints. Such finishes do not become yellow or chalky with age, it is said, because of the exceptional resistance of this silicone resin to moisture, oxidation, ozone and ultra-violet radiation. Another resin, DC 802, is recommended as a slower curing resinous plasticizer for DC 804.

Aluminum Paint

AREADY-MIXED aluminum paint has been developed by the *Nankee Aluminum Paint Co.*, 169-02 Jamaica Ave., Jamaica 3, N. Y., for exterior and interior, home and industrial use. Power-mixed for easy application on wood, steel, concrete and masonry, the paint furnishes a brilliant protective coating that is said to retain its luster and protective qualities for years. It may be applied by brush or spray and is claimed not to run or sag.

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you will agree . . .

Hours spent welding it over again are an unnecessary cost which can be eliminated. Your decision to use Arcos electrodes for your stainless or alloy welding job is a long step toward eliminating non-productive man hours. When you order Arcos, you receive electrodes which, in the hands of a competent welder, deposit the sound weld metal you need. Sound welds—physically and chemically right for the job—the first time and every time, eliminate costly chipping and rewelding. Specify Arcos and avail yourself of the knowledge and a product born of fourteen years' experience in making stainless and special alloy electrodes.



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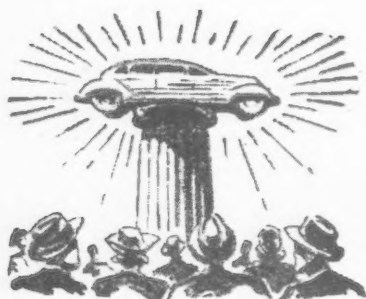
ARCOS CORPORATION • 304 GULF BUILDING, PHILA. 2, PA.

THE IRON AGE, December 5, 1946—9

Assembly Line . . .

WALTER G. PATTON

• Coal strike may stop some motor producers this week . . . GM hits new production peak . . . Patternmakers to ask for \$2.75 per hr minimum wage scale.



DETROIT—With at least three steel supply lines already cut off, automobile producers in the Detroit area turned their eyes to Washington this week to watch developments in the coal strike. If the strike continues through its second week as now seems probable at least one major automobile producer may go down and several others will undoubtedly be hanging on the ropes.

General Motors has indicated that steel deliveries to several of its divisions is on a day-to-day basis and any prolonged interruption in steel shipments will quickly result in plant shutdowns and idleness for thousands of GM employees.

Both Ford and Chrysler took the long Thanksgiving week-end to conserve fuel but made no attempt to hide the fact that they were also conserving even more precious steel which is down to a few days' supply at Ford. Chrysler and Kaiser-Frazer are reported to be the only automobile producers having substantial banks of flat-rolled steel at the present time.

On the eve of the coal strike General Motors established a new postwar weekly record of 30,467 cars produced or 1526 more than the previous GM production record for 1946. Last week's total was approximately 80 pct of the aver-

age production rate maintained during the 1941 model year by GM and brings total GM output for the year to date to 665,647 passenger cars in the United States. Total GM output of trucks so far this year is 260,398.

The number of GM suppliers on strike was down to 30 this week from a maximum of 143 reported in May. Unfortunately one of the 30 strikes—the coal strike—loomed larger to the motor industry than any work stoppage since postwar automobile production began. Not even the GM strike itself promised more serious repercussions for the industry which has apparently only traded a lot of flea bites for a carbuncle!

A RECENT survey of tooling sources by the Automotive Tool & Die Mfg. Assn. has revealed that inquiries have slowed up noticeably and that no substantial amount of 1948 model tooling has been placed. Kaiser-Frazer is known to be in the market for some additional equipment and there are reports that Tucker Corp. is also making inquiries despite the uncertainties prevailing as to the status of the Dodge-Chicago plant. Long-range tooling commitments are believed to be at substantially lower levels than a few months ago.

From time to time, word comes filtering down that the larger automobile plants have very ambitious plans for their 1948 models but no details have been announced officially. In view of the coal situation it is quite possible that new model announcements originally set for varying times from May to October 1947 may be set back for at least several months.

Meanwhile, the meager amount of work on 1948 cars has caused considerable anxiety in Detroit pattern shops. In addition to indecision on the part of automobile producers, the wages being paid to Detroit patternmakers are an important factor in the present situation. At present patternmakers are paid double time for work beyond 40 hr per week and delays in letting contracts may very well require the payment of large amounts of pre-

mium wages to permit completion of programs on schedule according to the tool association.

The unattractiveness of paying double time rates for patterns is indicated by the fact that after a work stoppage of 26 weeks earlier this year the patternmakers are back with a new wage demand calling for \$2.75 per hr minimum, an increase of 50¢ over the existing scale. Just why such wage demands are being made at a time when automobile prices are already too high and automobile producers can sell all the cars they can possibly build *without changing models* will have to remain a mystery.

CONSIDERABLE light on the possibility of automobile model changes is available from the disclosure that estimated tooling costs are right now between 50 and 60 pct above quotations given at the end of the war and the costs for 1948 models will undoubtedly be at least 150 pct above the pre-war rates. Thus, the task of balancing high tooling costs and possible material shortages against the advantages of changing models or introducing new lines of cars is one of the many difficult problems confronting automobile executives today.

An automotive trend that can be predicted with great certainty is that cost-cutting will be pursued with more energy than at any other time in the history of the industry. Ford will be the leader in this but other producers are sure to follow a pattern of rigid economy. For example, Ford has recently redesigned its wheels, changing the U channel into a modified V. While this change requires costly new dies it will save a few cents worth of steel per wheel and in today's economy this is regarded by Ford engineers as a worthwhile saving.

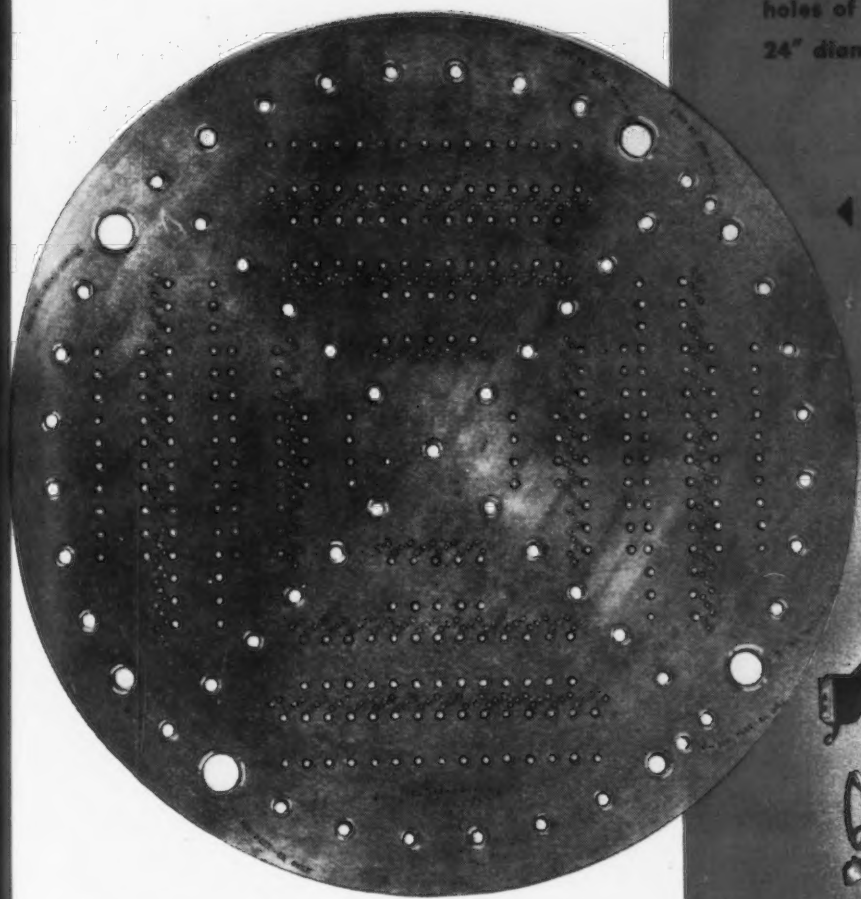
It is understood that every part of Ford cars and trucks will undergo similar microscopic scrutiny and suppliers with money-saving ideas are said to be among the most welcome visitors to the Rouge plant nowadays.

Production of Kaiser Specials and Frazers at the Willow Run plant is now in excess of 200 units

A Story of 734 holes

.0002" spacing tolerances . . . 734
holes of varied diameter . . . in a
24" diameter circular drill jig!

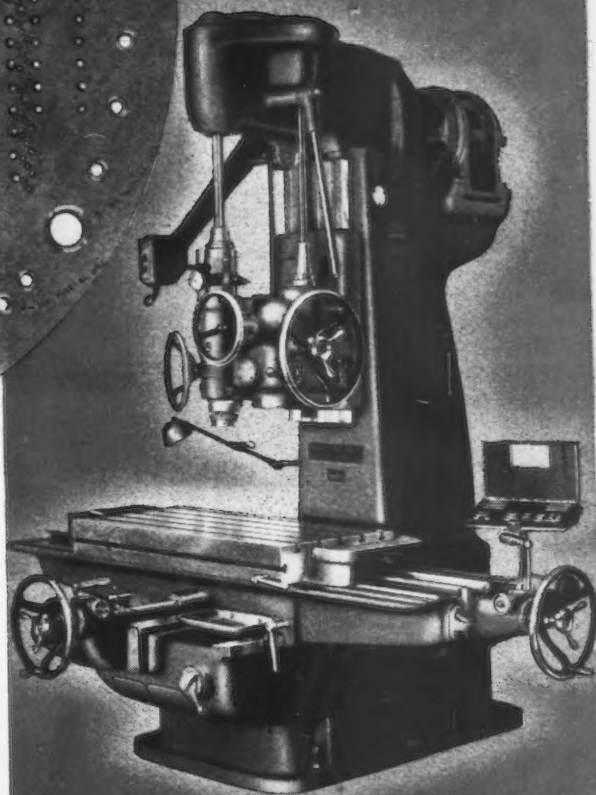
Photo courtesy of
Potts Machine Co.
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Work like this calls for extra-close precision boring
. . . the kind possible only with a precision-built
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Jobs like this are all in the day's work for the tool
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per day. A second assembly line is in operation and, barring interruption by the coal strikes and its corollary effects, K-F plans to step up production rapidly within the next 60 days.

NEW K-F cars have now been delivered or are enroute to all of Kaiser-Frazer's 4300 dealers—no small accomplishment in view of the fact that Willow Run was an empty plant a year ago and the first assembly line was started early in June this year.

According to K-F the new cars have been well received by the public and the company has yet to receive a report of a door rattle, doors that do not fit or mechanical failures in service because of basic errors in design or manufacture. Such shortcomings are common in first production cars, a company spokesman has indicated.

Up to the present time 5550 Kaiser Specials and Frazers have been built and the No. 2 line is actually being put in operation ahead of schedule according to K-F officials. The new mile-long assembly line is scheduled for completion in January. By that time it is expected that the press division will have 21 additional body presses with capacities ranging from 350 to 900 tons.

With the exception of Ford all major automobile producers have now announced price increases. Last week Chrysler announced that the Detroit factory retail prices of its Plymouth, Dodge, DeSoto and Chrysler cars will be increased immediately. The increases will vary by body type and will range from \$8 on the lowest priced Plymouth 4-door sedan to \$104 on the Chrys-

ler New Yorker 4-door sedan. The price pattern adopted by Chrysler is in contrast to the GM plan which calls for a \$100 increase on each of the GM lines. It will be recalled that both Studebaker and Willys-Overland have recently announced price increases.

At least one automobile producer has definite plans to introduce new models in January. The 1947 Oldsmobile will be shown to the motoring public at that time according to a recent official statement from Lansing.

Truck Sales Set Record

Detroit

•••Based on returns from 47 states there are indications that a new all-time record for trucks sales in any one month in the automobile industry's 50 yr history will be established for September, according to R. L. Polk & Co. statisticians.

New truck registrations from 47 states total 64,534 units, with 10 pct of the total sales potentials remaining to be tabulated. New truck registrations for September were one and a half times those for September 1941.

Total truck registrations for the year now stand at 412,079 units compared with 517,608 units from the same states during the corresponding period of 1941.

New passenger car registrations passed the million mark for the year 1946 with a total for September from 43 states thus far tabulated reaching 139,433 units bringing the year's figure to 1,005,009 units. Passenger car registrations for the month of September were nearly 50,000 more

than the reports for the same states in September 1941, when 81,173 new cars were registered.

2800 Machine Tools On Sale in Chicago

Chicago

•••A huge sale of 2800 war surplus machine tools, valued at \$25 million, began Wednesday, Dec. 4, at the Dodge Chrysler plant in Chicago. The battle between the National Housing Authority and WAA over the plant, which has made headline news, will not affect the sale, as all the machines have been screened for possible use by the Tucker Corp., which has leased the plant to manufacture a new type of automobile.

Pointing out that the machines offered represent only a part of the total to be sold from the giant plant, Stanley B. Adams, regional director, said that "short supply tools at the location will be offered later to priority holders, including World War II veterans. The present sale will be open to all interested buyers." Prospective buyers inspected the machines as they are situated throughout the plant, where they could make their selections and arrange for shipment on the spot with WAA sales personnel escorting them through the building. Tags bearing complete descriptions of all the machines and the prices were attached to each tool at the sale.

All sales were made at fixed prices or according to the Clayton formula. Mr. Adams in announcing the sale said, "No interest or market for these machines by priority groups has been determined and the machines are in sufficient quantity to satisfy any claims by priority groups."

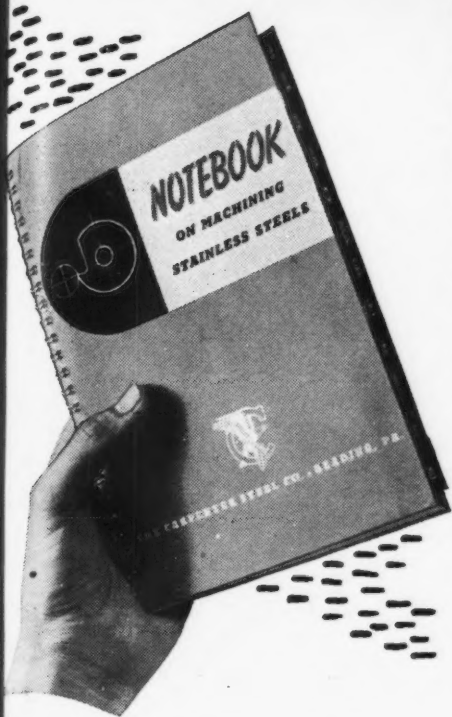
NAVY JET: North American's initial entry into the jet fighter field is this Navy XFJ-1. It features a very thin laminar flow wing with the marked dihedral so often found in Navy fighters. On the wing tips are droppable fuel tanks.



Pig Iron Ratings Extended

Washington

•••The certification plan under which foundries are receiving preference in purchasing pig iron to be used for housing products and for railroad brakeshoes has been extended through the first quarter of 1947. The action was taken by CPA under an amendment to Direction 13 to Order M-21, effective Nov. 29.



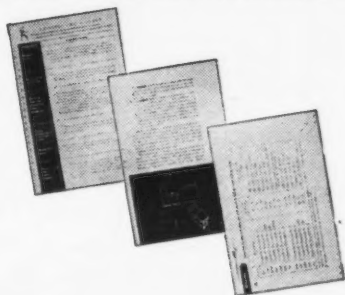
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THE IRON AGE, December 5, 1946—95

Washington . . . L. W. MOFFETT

• State and Commerce Depts. agree on plan to break down trade barriers . . . Less altruistic tone adopted as "do-gooders" leave government.



WASHINGTON—State Dept. activity in creating an International Trade Organization (THE IRON AGE, Oct. 17, p. 80) seems to have the whole-hearted backing of the Commerce Dept. Commerce support appears to be based largely on the fact that the proposed ITO has as a prime objective, the breaking down of trade barriers such as high tariffs, preferential agreements and quotas.

Many Commerce officials feel that in the starved world markets of today these trade barriers offer about the only major obstacle to the United States working its import-export trade up into the \$20 billion bracket before 1950. According to Commerce figures, even in these days of domestic scarcities the American international trade stands close to the \$15 billion mark.

In terms of annual rates, the nation is currently exporting about \$10 billion worth while it imports about \$4½ billion. Thus, international trade would need to be increased by only little more than \$5 billion to attain the goal visioned by the Commerce Dept. The field is there, officials say, if the nation takes advantage of it.

This is based primarily on the traditional tardiness of many for-

eign nations such as China, India, and even our next-door neighbor, Latin America, to mechanize and industrialize their countries. Having in mind the development of potential markets for machinery, equipment and other American goods, one suggestion is that American engineers and technicians be sent into such areas to bring about "progressive industrialization." It is emphasized that while the United States has only one-sixth of the world's population, it has more than half its industrial production.

RIGHTLY or wrongly, the so-called isolationist principle is being broken down. It is becoming more and more an accepted fact that the more this nation sells abroad, the busier American industries will be. It is self-evident, too, that other nations can buy only when they have either money or dollar credit or both.

Effectiveness of Commerce reasoning at times is somewhat dampened by an altruistic note, according to some sources here. "The world is full of people who want to throw off the mantle of poverty," recently declared one Commerce official who, rumor persists, will soon join other dethroned New Dealers. "Theirs are the beckoning hands reaching for a higher standard of living for themselves and for us a better assurance of prosperity."

"We must work with every means at our disposal to achieve this goal," he added. "Everywhere we must work to replace the hand loom with a power loom; everywhere we must work to take man out of the mule's harness and put him in the driver's seat."

A MORE hard-headed approach seems to have been adopted by W. Averill Harriman, new Commerce secretary. It, perhaps, may be a veiled hint to his subordinates as to the advisability of a more realistic approach to be taken under his leadership.

At any rate, with America as the world's greatest creditor nation, Mr. Harriman sees in the situation

the opportunity to use these obligations, as well as judiciously extended credits, to build up general world trade. Indicative of his position is a recent statement concerning American aid to France:

"We have already delivered large quantities of equipment and raw materials (to France) and will continue to do so during the next few years. Through loans . . . \$1.2 billions have been made available to finance equipment and raw materials imports. In addition, surplus property consisting of a great variety of goods useful to France's reconstruction have been sold on credit terms. Also, negotiations are going on for the sale to France some 750,000 tons of merchant shipping which will save her hundreds of millions of dollars."

Mr. Harriman makes it plain that as a businessman, he considers such deals good business; he hastens to disclaim any "do-good" motives.

"I would be less than truthful," he declared frankly, "if I left the impression that our actions are based largely on sympathy. Our aid is based instead on the solid ground of economic advantage to both nations. A broken France could not import from the United States \$165 million worth of goods, nor export to us some \$75 million worth of goods as she did in 1937."

COMPLYING with international conventions, the exchange of copies of patents with foreign countries is being resumed as rapidly as possible, according to Casper W. Ooms, Commissioner of Patents. During the war, the exchange was interrupted with all countries, except Australia, Canada, Mexico, Great Britain and Sweden. Prior to the war, the United States regularly exchanged copies of patents with 16 countries, including the foregoing five, Austria, Belgium, Czechoslovakia, Denmark, France, Germany, Hungary, Japan, the Netherlands, Norway and Poland. Exchange agreements have now been resumed with all of the countries formerly on the list except Hungary and Japan and two nations—Switzerland and Finland—

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- for cold ramming
- for hot patching



RAMSET is a *multi-purpose* basic refractory which replaces both Ramix and 695 Plastic. Containing improved bonds and incorporating all the superior qualities of these two well-known B.R.I. products, RAMSET has three additional advantages:

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RAMSET is recommended as a cold-ramming refractory for the construction and repair of open hearth and electric

furnace bottoms, and as a hot patch material for hearth maintenance, including the building and repair of tap holes.

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For the use of RAMSET as with all other B.R.I. products, the counsel of Basic Engineers is available at all times. Immediate shipment of RAMSET can be made in any desired quantity.



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have been added. Before the war, the United States received copies of Swiss patents but did not send its patents in exchange.

The U. S. Patent Office is now sending to the countries on the exchange list not only copies of all patents currently issued, but is also supplying as rapidly as possible copies of some 125,000 patents issued during the period when communications were broken off.

The various foreign countries are likewise now sending the U. S. Patent Office copies of all of their current patents as well as copies of all patents issued during the war period, insofar as possible. In some cases, however, foreign patent records were destroyed and cannot be replaced.

Not all of the countries on the exchange list regularly print copies of their patents. Canada, Mexico and Belgium publish only a Patent Office record, which is sent to the U. S. Patent Office in exchange for copies of U. S. patents.

The free exchange of ideas between countries is essential to continued industrial advancement, according to Mr. Ooms. It is of particular benefit to the U. S. Patent Office, he pointed out, since the patent law specifies that patents can

be issued only for new inventions and discoveries and cannot be granted for anything previously disclosed in a foreign patent or printed publication.

THE American Military Government in Germany is putting on the heat against internationally recognized cartels. German agencies in the U. S. zone have been instructed not to allocate material imported under the approved ex-

port program to such cartels. Entry into world trade of independent cartels, said AMG, will be hastened by deconcentration of economics.

Machine tools looted from France by the Nazis have been returned to the country by AMG. AMG also reports that some industrial machinery, "two horses and an automobile" have been returned to Poland. It did not say how wheezy the horses or decrepit the automobile might be.

Fixed Price Register For Surpluses to Be Used by WAA Offices

Washington

• • • WAA's recent instructions to its regional offices to continue to use its fixed price register to establish prices on its billions of dollars' worth of surplus property, the agency said, is designed to help stabilize the national economy. They supplement an earlier announcement by Administrator Robert M. Littlejohn that WAA would generally adhere to the price schedules in effect before

President Truman directed decontrolling of prices.

The register, listing prices for virtually all of the thousands of different kinds of surplus property, was developed in conformity with OPA ceilings.

If necessary, it was pointed out, upward adjustments in WAA prices may be made by the Washington office to prevent windfalls and to discourage speculation in the case of certain short supply items, the market prices of which rise sharply.

Since goods usually are not offered on a competitive bid basis until they have failed to sell at a fixed price, WAA does not anticipate that bids submitted will be higher than the previous fixed price set for goods. However, it was stated, if such bids should be received, they will be honored even though they might be higher than the previous fixed price or the former OPA ceiling.

"Our prices on each kind of property to be sold will be established at levels which will enable us to sell the property promptly and in an orderly manner," said General Littlejohn. "Our fixed prices may be higher or lower than the acquisition cost of the property to the government, but under no circumstances will we contribute to inflation by deliberately boosting our prices on scarce items.

"Rather, we will price property for disposal with a view to setting an example for private industry. We will maintain a reasonable price level on each category of goods, in the belief that commercial buyers will not jeopardize their country by reselling surplus goods at exorbitant markups and at wholly unreasonable profits."

THE BULL OF THE WOODS

BY J. R. WILLIAMS

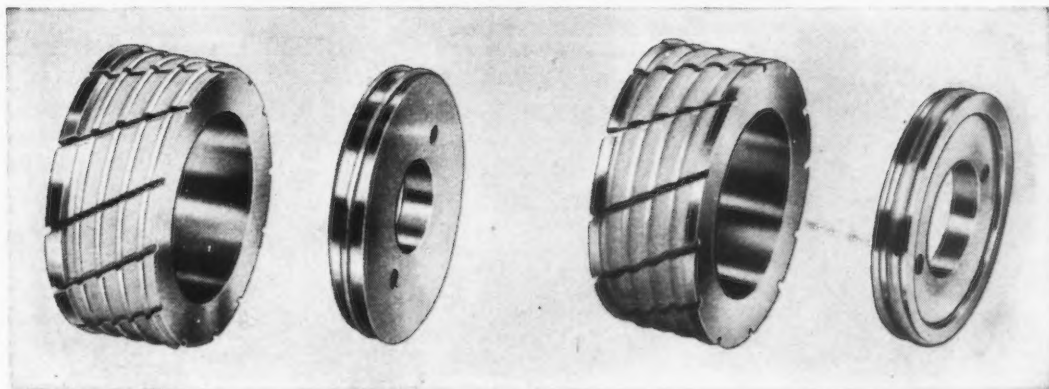


SHEFFIELD

MACHINE TOOL DATA

MFG #111

CRUSH GRINDING CUTS MANUFACTURING COSTS OF SMALL AND LARGE SCREW CAP FORMING ROLLS



From left to right - (1) Crusher roll for truing the grinding wheel used to produce the internal die; (2) The resultant internal die; (3) Crusher roll for external die; (4) The external die.

The inner and outer rolls or dies used to roll the thread on jar lids have heretofore been made by chasing on a lathe with a tool formed to the desired thread profile. The rolls are then heat treated and polished. Distortion of form occurring in heat treating is a common cause for rejects.

This problem has been eliminated, production time greatly reduced and uniformity of quality assured by the following methods:

(1) Crusher rolls to desired thread profile are made on standard H.S.S. blanks with the Sheffield Micro-Form Grinder.

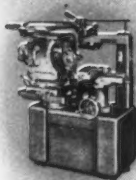
(2) The resultant crusher roll is used to dress a 120 grit wheel on the Sheffield Precision Thread and Form Grinder

(3) This Sheffield Precision Thread and Form Grinder is then set up to grind the dies in quantity with two passes of the grinding wheel over the work.

While it was possible to produce the form in a single pass at reduced work speed, the most desirable combination of production time and product finish was obtained by taking two passes, one for rough grinding and one for finish grinding.

In grinding, two parts were placed on an arbor. Total grinding time per part was slightly under 4 minutes. Approximately an hour's labor per die is saved by using crush grinding on Sheffield equipment, and the die so produced is more uniform in quality and the finish is better.

Thousands of other production cost problems can be answered satisfactorily by crush grinding with Sheffield equipment. Write for Bulletins M-100-145 and M-120-144.



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Dayton 1, Ohio, U.S.A.

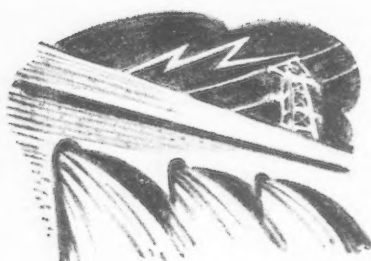
MACHINE TOOLS • GAGES • MEASURING INSTRUMENTS • CONTRACT SERVICES



West Coast . . .

ROBERT T. REINHARDT

• Westerners bristle as implication is made that the East should supply finished sheet metal products... Packard eyes the western market... Geneva employment hits 3000.



SAN FRANCISCO—"Tell us our only child is cross-eyed, rub salt in open wounds—do anything, but don't ever say: 'It might be easier if some allocation program covering the distribution of available housing equipment from sources other than the new manufacturing industries on the Pacific Coast were essayed.'"

Such is the howl that went up among western sheet metal warehousemen and fabricators when they received word from an official of the Office of Materials Supply that the above statement had been made by "two different steel officials" when interviewed on the subject of the sheet steel shortage in the West. One and all, local users of the scarce commodity acclaim this remark as concrete evidence that the East is bound and determined to throttle western industry.

According to the survey made by "an experienced reporter on steel problems" who interviewed Pittsburgh steel company executives, the suggestion was freely made that since household equipment "is being offered for sale 'over the counter' in some areas" that such fabricated equipment should be shipped west instead of the steel sheets from which westerners could manufacture it.

This investigator's survey was made before the OPA passed on and his report said, in part:

"I am afraid the view of one realist . . . to the effect that even if steel prices were more favorable, eastern and midwestern mills would not ship to the Coast, preferring to take care of their long-range customers closer to home, is a generally correct reflection of the attitude of the mills I have discussed this matter with.

"It is emphasized to me that while there is a 'crisis' in steel supply on the Pacific Coast, there is the same relative situation in virtually every large steel-consuming center in the nation. Furthermore, the economics of the day has forced many steel producers to look to nearer-by markets, obviating high-freight absorption. Most steel producers are, as you know, trying to allocate their output on the basis of prewar customer relationship. On the Pacific Coast, as you have pointed out, there have sprung up many new manufacturing plants to serve the building activity there. Even at a price, some steel officials express doubt that they would be interested in denying their old, established customers in near-by markets finished steel for what may prove to be a temporary boom on the Pacific Coast."

THAT reference to "what may prove to be a temporary boom" was the stimulus which raised loyal westerners' blood pressure to the apoplexy stage, and brought out reams of statistics to prove that this area is the fastest growing section of the country and that demand for consumer goods of all types—not only housing materials—was going to continue to grow ad infinitum.

In concluding his report, the investigator said:

"I venture . . . my frank opinion that under the present circumstances it would be difficult to find any eastern sheet producers anxious to step up allocations to the Pacific Coast. One large producer tells me he is shipping in the fourth quarter to that area 7000 to 8000 tons of sheets over and above the regular quarterly quotas

set aside by his company for the area."

After the emotional wave had passed and tempers had cooled enough for coherent conversation, warehousemen and fabricators here settled down to try and find once again a practical solution to the problem of shortages which threatens their economic future.

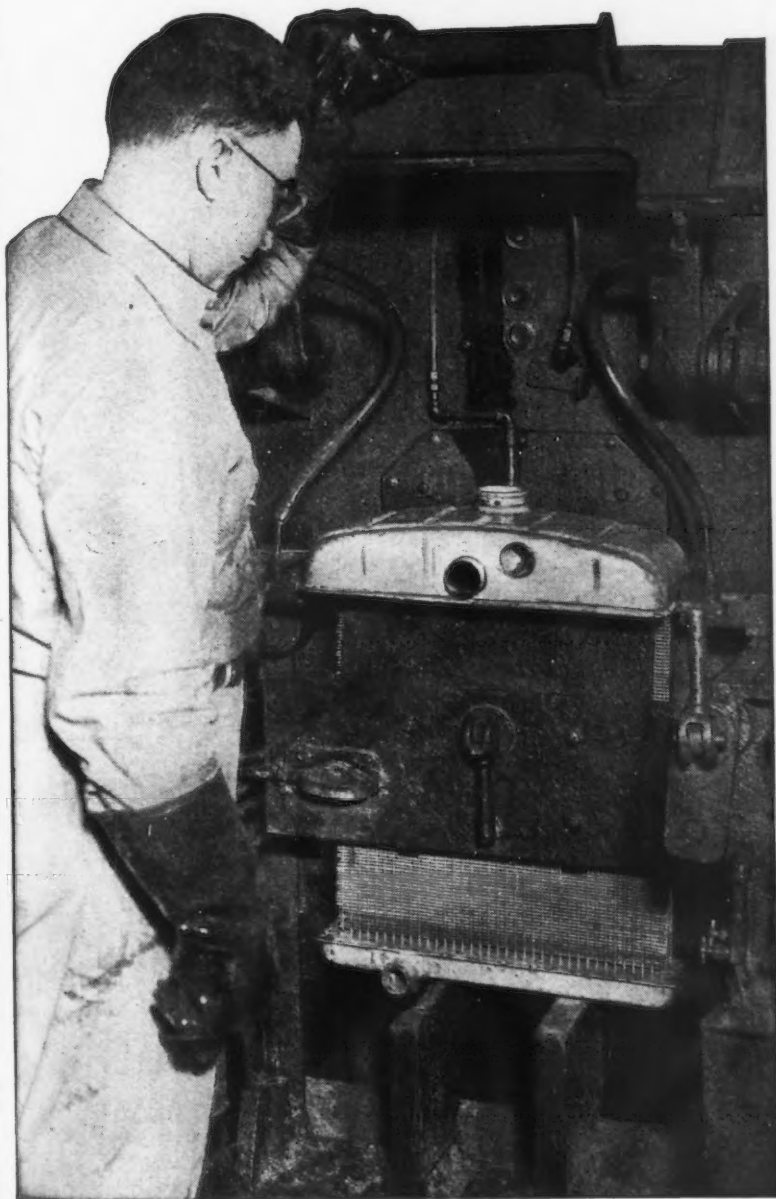
While there undoubtedly will be no abandonment of plans to force eastern mills to help the West tide over this period, there is the growing sentiment that "freedom from eastern domination" lies only in the development of western suppliers. There is talk of greater support for the proposed 50,000 ton sheet mill in Los Angeles and a similar mill in Seattle. Both of these projects have been considered marginal economically, but if enough sheet users underwrite production either as a form of insurance or in retaliation for "discrimination" the proposed developments have a chance of success even according to some of the conservative thinkers.

AT least two sheet producers—Columbia Steel Co. and Bethlehem Pacific Coast Steel Corp.—generally remain in favor among warehousemen and fabricators. This high spot on the ladder of economics is attributable to the fact that their customers and would-be customers are at least giving them both "A" for effort, even though deliveries are not all that is asked. With the exception of specialty sheets still coming out here in some quantity, other mills have contributed little in the past year toward holding or developing a market.

Columbia, of course, is pouring its total output of hot-rolled and galvanized sheets into this market, but since 50 pct of this production goes out on CC rated orders, there isn't much left for the warehousemen and small fabricators. Bethlehem is said to be shipping as much or more sheets into this market as prewar and is looked to for considerably heavier deliveries in the second quarter of 1947 when the Sparrows Point mills get rolling.

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here to pay all freight which an eastern mill might ordinarily absorb in a competitive market, have apparently had no effect in increasing supply. Of course, the sheet metal fabricators either wholly or partly owned by eastern steel companies are faring all right, which condition doesn't put any oil on the troubled waters surrounding the cast-away independents.

In spite of the sheet shortage and affording ammunition for those who decry any implication that this area is offering only a "boom" market, 96 new industrial projects to cost \$7,618,700 were announced for October in northern California. This brings the total for this year to \$122,169,403 which compares to \$116,743,045 for the same part of 1945.

Employment figures for the state of California also reflect continued increases in industrial activity. The Dept. of Industrial Relations for the state estimates that the total number of employees in manufacturing industries in California for the month of October was 716,900 as compared to 688,300 for the same month last year.

SEATTLE—Not a few industrialists read with considerable interest about developments of "nuclear reactions, or piles" at the Hanford project where General Electric Co. is carrying out experi-

ments. The coal shortage accentuates the hope that out of the local research will come some reliable power source largely free from labor controls.

J. Harry Gatewood, area assistant of the Solid Fuels Administration, estimated last week that the coal supply in this area was adequate for not more than 12 days. Seattle foundries generally expected their coke to last not more than 60 days and some expected to drain their reserves in half that time.

Fortunately for this section, the Pacific Northwest depends on electricity, oil and sawdust for heat and power although some homes and public buildings are heated by coal. The University of Washington was forced to close one day because of the lack of heat.

While the local steel industry is not directly affected by the shortage, there is some concern about the pig supply and industrials in general are anxious over deliveries of raw materials and components from other sections of the country.

A small boon to the scrap market was seen in the scheduled scrapping of the destroyer *Tattnall* which was purchased by the R. J. Gustav Co. for salvage. The 314 ft craft will be stripped of its equipment, and decks and superstructure sold for scrap. Tentative plans to sell the hull intact for a breakwater

is not meeting with general approval of openhearth and steel furnace operators who consider even this small tonnage as valuable in keeping operations up.

LOS ANGELES—"When our company can deliver 40,000 cars annually west of Denver, there will be one of our assembly plants in the general vicinity of Los Angeles," said George T. Christopher, president and general manager of the Packard Motor Car Co. here last week to discuss sales plans with his dealers.

"Surveys have indicated to us that about 50 pct of the West Coast's potential business is close to this city," he added. Explaining that the Detroit area alone was not responsible for the poor showing in the production of new cars, Mr. Christopher stated that the entire country was responsible as the automobile industry was dependent upon suppliers in 1375 cities in 44 states for parts and materials.

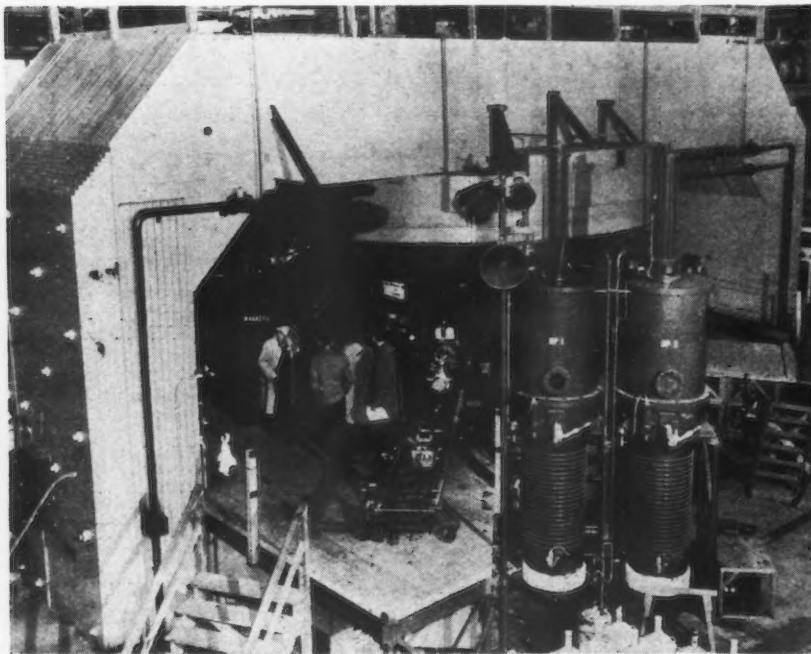
"If Packard had been able to achieve the production planned for this year we would have delivered 5312 Clippers in the Los Angeles area by Nov. 1. Instead, we were able to ship only 1490.

SALT LAKE CITY—On the heels of the announced motor freight rate of \$8 per ton for finished steel from Geneva, Utah, to San Francisco and Los Angeles there is considerable speculation as to whether the request for a 60¢ cwt from Geneva to Seattle and Tacoma will temporarily be allowed by north coast and California rail lines. The present rail rate is 66¢ cwt with a minimum of 80,000 lb. The reduction would equalize rates with those in effect from Geneva to Portland, Ore.

At a Seattle hearing the matter was taken under advisement and a decision is expected any day. So far as can be determined, West Coast steel producers are offering no objection to this equalization.

A slow-down of production at Geneva because of the coal strike has made it necessary to lay off only 50 men and employment is near the 3000 mark. As soon as the strike ends, increased hiring is expected in preparation for putting additional openhearth furnaces and the remaining blast furnace into operation. This third blast furnace is reported ready to operate as soon as coke again becomes available.

ATOM BREAKER: 200 million volt cyclotron in operation at the University of California, Berkeley, Calif.



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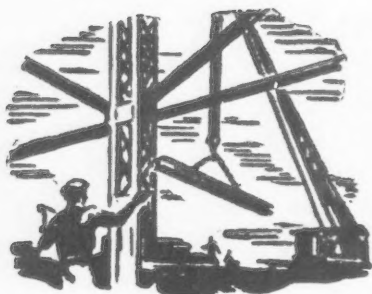
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European Letter

JACK R. HIGHT

• Europeans flock to Stockholm to wallow in comparative luxury . . . Social Democratic Government moving slowly in industry.



STOCKHOLM — The hazards of a Social Democratic, or Labor Government appear to the casual visitor to weigh rather less heavily upon the national consciousness than they do in London under a somewhat similar government. The approach by the government itself is more relaxed, and there is a general feeling that the economic and social problems which do exist are being studied with quiet thoroughness, before any drastic decisions are made toward socialization.

As I have described from London, the Labor Government of the United Kingdom has laid down its line in advance, defining just what industries are to be nationalized. The British Labor party takes the stand that it was elected on a pledge to nationalize the mines, railways, power, road transport and steel. In its governmental opinion to fail in any of these respects would be to betray the confidence of the party members.

The Social Democratic party of Sweden, on the other hand, feels itself to be under no such obligation. There are in Sweden today, several government-owned industrial enterprises, including a war-built steel mill at Lulea in the north, a shale oil industry, a small war-developed film factory, a timber and pulp industry that is the

export field, and a war-developed peat industry. These firms in some cases are in competition with private enterprise, but most of them were developed to replace war reduced imports. The method of procedure will be somewhat different in the case of different industries, but it may develop that some of the war-created firms will be allowed to die.

The government is using the same system adopted by France and England with regard to studies of certain industries with more than the usual share of problems. The Swedish glass, furniture and boot and shoe industries are now the subject of studies by working parties representing management, union and consumer interests. These working parties are offered a number of alternative conclusions, that is, they may recommend that the industry be subjected to one of several possible methods of government control, that it remain entirely in private hands, or that it be nationalized.

These studies have been started recently and are all expected to be completed within a period of 1 yr. The government considers the boot and shoe industry to be in particularly bad condition. This conclusion is based among other things on the lack of regularity in employment, plus the strong hand of American machinery builders said to be affecting most of the many small producers in the field.

APART from the above studies, there is no direct, long-term government planning for industry as a whole. There are war-born controls still effective on building, allocations of short supply raw materials and priorities systems for the rationing of scarce manufactured goods, but the policy to date has been to drop these when sufficient supplies of particular products become available. The building license system, however, is likely to remain indefinitely.

Although the Social Democrats are not actively pushing forward a true Marxian program, they are generally planning that the Swedish working man shall increasingly in the future get a larger share of the profits of manufacture. The avowed policy is to foster the cheap mass production of consumer goods, and to get enough money into the

workingman's hands to enable him to buy these goods.

Cognizant of the fact that before the war the Swedish standard of living compared with most European countries was considered to be high, the government is determined that it shall recover this level and substantially increase it. The housing aspect of the living situation is one branch which the workingmen feel needs particular attention. Before the war the average workingman's home, and most rural homes consisted of two rooms for the family. Progress had been made in recent years to channel new buildings for labor groups into more comfortable types, and the government is determined to push the program forward to a point where the average is a three or four room house rather than two.

THERE is an air of unreality for me in hearing all of this serious talk about the great need for improving the lot of the Swedish people. I have been listening for three days to government experts, engineers, sociologists, professors, and the Swedish Minister of Commerce (Gunnar Mrydal, who studied the Negro problem in America for 4 yr on a grant of the Carnegie Foundation: *An American Dilemma*), all of whom impressed upon me the determination to raise the standard of living here. But to me, Sweden is an island of unreality, a scrap of undamaged marble bas-relief left among the continent of ruined rubble that was once Europe. I had no realization of how a year spent living in London had conditioned my way of living and even my way of thinking, until I stepped off a plane here in Stockholm a few days ago.

There is little I can add to the reams that have already been written by ecstatic Continentals who have been existing in terror and austerity for several years on beholding the shops of Sweden. They are the first thing I have seen to compare with America as I left it, with the addition of displays of 1946 American cars in the showrooms. And there are also many of them on the streets.

• The sight of row on row of unscarred buildings, block after block of ugly vari-colored neon signs, and unlimited street and show-window illumination was like revisiting a



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childhood swimming hole for me. Some of the consumer goods available here can be seen in France, and more frequently in Belgium, where the government has imported rather freely in the past year, but in those countries prices are so inflated that most goods are beyond reach at existing rates of exchange. Here, in contrast, the government controls have actually kept price levels fairly well in check.

The discipline must be much better, too, as this is the first capital of Europe where I have not had some sort of off-color or downright illegal foreign exchange transaction offered to me on a street corner. This is partly due, of course, to the fact that the simple arithmetic of day to day living here in Sweden does add up to the possibility of a workingman buying the necessities of life with his weekly wage.

On the other hand, most of the Continental countries countenance no such simple operation. Whether he is a German, selling slowly his household goods in the black market to supplement his rations (this technique was developed by occupied peoples under the Nazi heel) or whether he is a Belgian getting an under-the-counter bonus from his firm above the government determined wage, most of the work-

Pittsburgh Plus Again

Stockholm

• • • The Federal Trade Commission will be interested to know that the "Pittsburgh Plus" system is being revived in post-war Germany. Under the determined sponsorship of the Office of Military Government for Germany, U. S. Section (OM-GUS) in Berlin, freight charges are being added to the selling prices of salt and caustic soda being sold to Germany by the U. S. officials. Prices are on the basis of the shipping rate from New York ports to Bremen, although the deliveries are to be made to Scandinavia.

In the case of both products, \$15 per ton is being added to the price, on the reasoning that, "If they bought it in the U. S., that's what it would cost them." The fact that the U. S. never has supplied this particular market has not yet been fitted into the jigsaw puzzle.

ing people over here just cannot live in any month on what they get from their job in that month.

ALL of this glory that is Stockholm combines to make it a very popular city in this world. The hotels are crowded, the trains are crowded and the planes are

crowded. But it is not necessary to make reservations in advance for every normal human function, as is roughly true in London at present. Despite a general adequacy of supplies, the Swedish Government rations meat, butter and bread, to permit a maximum of assistance to less fortunate neighboring countries. Aside from a general tendency to be hospitably lenient to an obvious foreigner, the coupon system is rigidly enforced, being followed through in the restaurants as well as in the homes. I wonder who sold the U. S. Government on the idea that rationing couldn't be applied successfully to restaurants!

There are some restrictions on the amount of goods that a visitor may carry away from his visit to Sweden, but they are notably lenient. I have almost given up trying to work in planning just what I shall carry back to London to restock the diminishing larder.

I note a general effort here in Sweden to de-emphasize the recently announced treaties with Russia for an exchange of commodities and also for a loan financing Swedish exports to Russia in the coming years. This effort is so general that it almost has the appearance of a general official propaganda policy. The Minister of Commerce, who was one of the most important Swedish figures in the loan negotiations, told me that it should be considered as a part of the general Swedish program of fostering exports by loaning to countries devastated by the war who need manufactured goods. Such a program of credits is a part of the Social Democratic platform to enable post-war Sweden to expand its foreign trade.

He also called attention to the fact that although the total sum of the credit was large (1 billion Swedish crowns \$26,666,666) for such a small country, the amount was agreed to by the wartime Swedish coalition government, for which all principal parties were responsible, and therefore this government could not easily offer a smaller sum.

The goods to be delivered under the terms of the treaties have also been criticized in some quarters, but the government has specified that deliveries in the first year will not be large, as industry here is not yet ready to make large shipments.

OFF TO THE RACES: Rodney Taylor sits in the driver's seat of a 1900 De Dion Bouton, one of 120 veteran cars, which journeyed from London to Brighton to celebrate the 50th anniversary of British motoring's emancipation day, which marked the repeal of the rule that an auto must be preceded by a man with a red flag.





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THE IRON AGE, December 5, 1946—107

PERSONALS.

• • •

• **A. F. Franz** has been appointed vice-president in charge of operations of the Colorado Fuel & Iron Corp., Denver. He succeeds **Robert T. Dunlap**, who has resigned. Before coming to the Wickwire Spencer Steel Div. of the corporation at Buffalo as general superintendent of the Buffalo plant, Mr. Franz was associated with the Allan Wood Steel Co. He was appointed works manager of the Colorado Div. last March. In his new position he will have complete charge of all operations of the corporation and for the present will maintain his headquarters at Pueblo, Col.

• **Dr. C. Earl Webb** has been appointed chief engineer of the American Bridge Co., Pittsburgh, succeeding **Dr. Charles F. Goodrich**, who has retired. Succeeding Dr. Webb as the company's western division engineer is **Albert P. Boysen**, who has been associated with American Bridge since 1912. Dr. Webb began his association with American Bridge in 1914 as a draftsman in the plant at Gary, Ind. In 1922 he became designing engineer at the company's Chicago office and served in this position until his appointment in 1935 as western division engineer in Chicago. Mr. Boysen started with American Bridge as a shop clerk and later became a draftsman. Since 1942 he has been in charge of design for important U. S. Steel building activities in the western district.

• **Robert H. Kittner** has been elected vice-president in charge of the newly-created plastics and chemicals division of the Glenn L. Martin Co., Baltimore.

• **Harry A. Dennis** has been appointed assistant district manager of sales in the Chicago office of Lukens Steel Co. and subsidiaries, By-Products Steel Corp. and Lukenweld, Inc. He had been sales representative for Lukens and its subsidiaries in Erie, Pa. and vicinity. Mr. Dennis has been associated with the company since 1939, starting as a helper in the openhearth. Later he was a welding research engineer, and for several years had been engaged in welding service engineering work as a member of the technical sales service of Lukens and its subsidiaries.

• **Howard C. Kaeff** has been appointed general superintendent of the strip and tin plate mill of the Indiana Harbor, Ind. works, Youngstown Sheet & Tube Co. Mr. Kaeff started in the steel business with the Carnegie-Illinois Steel Corp. at Gary, and was formerly associated with the Tennessee Coal, Iron & Ry. Co. of Fairfield, Ala., as superintendent of the cold reduction department.



PAUL W. POLK, vice-president and manager, Threadwell Tap & Die Co.

• **Paul W. Polk** has been appointed vice-president and manager of the Threadwell Tap & Die Co., Greenfield, Mass. The plant, equipment and assets of Threadwell were acquired by the Sheffield Corp. of Dayton last August and according to present plans will continue to be operated as an independent subsidiary. For the past several years Mr. Polk has been vice-president of the Sheffield Corp. During the war he served for 2 yr as an officer in the U. S. Navy. Although continuing as a director and officer of Sheffield, Mr. Polk will devote all of his time to his new responsibilities at Greenfield.

• **B. E. Kibbee** has resigned as executive vice-president of Sharon Steel Corp., Sharon, Pa. He will continue as treasurer and a member of the board of directors.

• **David S. Holbrook** has been elected vice-president of Algoma Steel Corp., Ltd., Sault Ste. Marie, Ont. He came to Algoma in 1944 as assistant general manager and in 1945 was appointed executive assistant to the president. Mr. Holbrook entered the steel industry with the Carnegie Steel Co. at Youngstown, where he held various engineering and operating positions until 1940 when he was transferred to the Homestead district of Carnegie-Illinois.

• **Karl D. Fernstrom**, former vice-president in charge of production of Cramp Shipbuilding Co., has been made vice-president and director of production of the American Machine & Foundry Co., Brooklyn.

• **Francis L. Quinlan** has been appointed to the new position of public relations manager of the Fafnir Bearing Co., New Britain, Conn. **Truman L. Hunt** has been named advertising manager. Mr. Quinlan entered the company in 1943 after 17 yr as a newspaperman. He has served during much of the past year as advertising and publicity manager with Fafnir. Mr. Hunt has been assistant advertising manager at Fafnir since last March.

• **C. V. Booth** has been named chief financial officer of the Fisher Body Div. of General Motors Corp., Detroit. Mr. Booth becomes ranking financial officer of Fisher Body succeeding **M. E. Sheppard** who has resigned.

• **Stuart D. Brown**, who recently resigned as sales manager of the engineering works of Dravo Corp., has been appointed marine representative for the American Forge & Mfg. Co.

• **R. W. Sharp** has been appointed district manager and sales engineer of the new Indianapolis office of the Lincoln Electric Co., Cleveland. The new manager returns to Lincoln Electric after 3 yr service in the Navy as a welding engineer at both east and west coast yards. He was covering the Kentucky and southern Indiana territory for the company at the time he joined the Navy and prior to that was assigned to the Columbus, Ohio office of Lincoln Electric. He joined the company in 1939.



JOHN C. McPHERSON, manager of patent research and development, International Business Machines Corp.

• **John C. McPherson** has been named manager of patent research and development of International Business Machines Corp., with headquarters in New York. He was previously director of engineering and prior to that head of the company's future demands department. Mr. McPherson joined IBM in 1930 as a systems serviceman, later transferring to the transportation department in New York. He subsequently became a senior sales representative specializing in railroad accounts, and later assistant manager of the transportation department. He became manager of the future demands department at the time of its creation in 1940. **Charles H. Woolf** has been appointed manager of all International Business Machines Corp. sales and services for the Pacific Coast area, and **Edward Perkins** has been appointed his special assistant. They will make their headquarters at San Jose, Calif. Mr. Woolf joined IBM in 1930 at Los Angeles, and was assistant IBM manager in Chicago prior to his present promotion. Mr. Perkins, who was manager of the company's electric accounting machine division in San Francisco prior to his present promotion, joined IBM in 1925 in New York as a systems serviceman, later transferred to sales work and held various sales and executive positions there and in Philadelphia.

• **Frank X. Karle** has been elevated to treasurer of Aluminum Industries, Inc., Cincinnati, succeeding **Harry J. Hater**, who retains the office of president and general manager. Mr. Karle, who was elected a director in September of this year, has been associated with Aluminum Industries, Inc., since 1924. Starting as a bookkeeper, he has advanced through the offices of auditor and comptroller to his present position.

• **Frank J. Prime** has been appointed assistant to the vice-president, radio tube division, Sylvania Electric Products Inc., Emporium, Pa. He joined the Sylvania Electric staff in 1932 as a cost accountant in the parts manufacturing department, later serving as superintendent of parts manufacturing, superintendent of the Montoursville plant and cost accountant for the radio tube division.

• **Nelson F. Bowe** has been named district manager in charge of Ford Motor Co.'s district sales at Edgewater, N. J. **C. J. Seyffer**, who has served in the dual capacity of regional manager of the eastern region and district manager at Edgewater, will devote his efforts to management of Ford and Lincoln-Mercury eastern regional sales activities.

• **William G. Piwonka** has been named technical service manager of the Motor Coach Div., White Motor Co., Cleveland. He is a past chairman of the Cleveland section of SAE and a past president of the Central Transit Systems.

• **John V. Drum** has been appointed manager of farm equipment sales for Graham-Paige Motors Corp., Detroit.

• **A. Verne Jackson** has been named Detroit sales representative for Muskegon Piston Ring Co.

• **A. W. Wigglesworth** has been elected chairman of the board of the Hill-Clarke Machinery Co., Chicago. **H. W. Mons** has been elected president, **W. L. Dittfurth**, vice-president and treasurer, and **T. H. Price**, secretary. Mr. Wigglesworth was formerly president, and Mr. Mons formerly vice-president of the company.



RUDOLPH T. ELSTAD, president, Oliver Iron Mining Co.

• **Rudolph T. Elstad** has been elected president of the Oliver Iron Mining Co. of Duluth, Minn., a U. S. Steel subsidiary. Mr. Elstad succeeds **LeRoy Salsich**, who is retiring after 45 yr of operating and executive experience with the Oliver Co. **Walter L. Maxson**, director of research, and **Jerome E. Machamer**, assistant general superintendent of the Hibbing-Chisholm district, have been elected vice-presidents of the Oliver Co.

Mr. Elstad began his service with the company during his summer vacations in 1917 and 1918.

Mr. Salsich joined the Oliver Co. as a mining engineer at the time of the mining company's formation. A year later he became chief engineer for the Hibbing properties. He became president in 1930.

• **Reginald L. Middleton** has joined the sales force of the Falk Corp. in Milwaukee as sales representative in the Dallas territory. He makes his headquarters in the Dallas office. For 12 yr he has been associated with the Continental Supply Co., first as district manager of machinery sales in Tulsa, then as director of purchases in the Dallas office until he resigned early this year.

• **Harry J. Schedler**, formerly in charge of the Minneapolis-Honeywell Co. Milwaukee branch, has been named Milwaukee district manager for the Moore Corp., Joliet, Ill.



A. C. ROETH, JR., district sales manager, St. Louis, Inland Steel Co.

• **A. C. Roeth, Jr.** has been appointed district sales manager of the St. Louis office of the Inland Steel Co. Mr. Roeth started with Inland in 1933 in the mill at Indiana Harbor. He joined the sales department in 1936 and in 1939 became assistant district sales manager in St. Louis. He succeeds **P. M. Lorenz**, who will be transferred to the Milwaukee office as district sales manager, assuming his new position on Jan. 1. Mr. Lorenz joined Inland in 1910 and has previously served as manager of the Detroit office of the company. Mr. Lorenz succeeds **Malcolm E. Gregg**, who has been the sales manager of Inland's Milwaukee office since 1934. Mr. Gregg joined the Inland staff in 1924 as assistant district sales manager of the St. Paul office following several years of service with Republic Iron & Steel Co. and Lackawanna Steel Co.

• **Thomas E. Quinn**, 58, supervisor, insurance section, traffic division, U. S. Steel Export Co., New York, died suddenly of a heart attack on Nov. 25. He joined the Export Co. 30 yr ago.

• **Arne Hedstrom**, metallurgist for Vanadium-Alloys Steel Co., Latrobe, Pa., died Nov. 23.

• **Charles D. Young**, 58, vice-president, Railway Appliance Corp., died Nov. 16. Mr. Young was formerly Chicago sales manager for Metal & Thermit Corp.

• **J. F. Simon, Jr.** has been appointed works manager of the Paul & Beekman Div. of Portable Products Corp., Philadelphia. Mr. Simon comes to Paul & Beekman Div. from the Roller-Smith Co., Bethlehem, Pa., where he had been plant manager for the past 2 yr. Previously he was with United Specialties, and for 7 yr with the Carrier Corp. as production manager. At Paul & Beekman Div. he will be directly responsible for all production.

• **L. B. Perkins** has been appointed assistant manager of the D. A. Stuart Oil Co., Chicago. He has served as secretary-treasurer since 1944. **F. J. Schmitt** has been made director of sales of the same organization, having previously served as sales manager since 1942. **C. N. Cox**, formerly of Archer-Daniels-Midland Co., is the new sales manager, and **J. E. McCoy**, formerly assistant to the sales manager, is now assistant to the director of sales.

• **Peter B. Payne** has been appointed general manager of the John B. Salterini Co., New York. Mr. Payne is an industrial engineer, formerly on the supervisory staff of Corrigan, Osburne & Wells, and will remain on their staff as consultant.

• **Arthur A. Leedy** has been appointed director of engineering of the Seiberling Rubber Co., Akron, Ohio.

• **R. L. Whitney** has been appointed district apparatus and supply manager of the east central district of the Westinghouse Electric Supply Co., New York.



JAY STRANAHAN, sales manager, Chicago district, Washington Steel Corp.

• **Jay Stranahan** has been named sales manager, Chicago district, for the Washington Steel Corp., Washington, Pa. Mr. Stranahan has been associated with the stainless steel industry for the past 7 yr and has been a sales representative in the Cleveland and Philadelphia districts.

• **Dr. L. B. Sebrell** has been appointed director of research and chemical products development of Goodyear Tire & Rubber Co., Akron, Ohio. **Dr. H. J. Osterhof** has been appointed manager of the research department. **Dr. A. M. Clifford** will be in charge of basic raw materials research; **H. A. Endres**, in charge of chemical products research; and **J. A. Merrill** will have charge of mechanisms and processes research at Goodyear. **I. D. Patterson** has been named assistant manager of chemical product development.

• **Henry J. Noble, Sr.**, 56, works manager of the American Cast Iron Pipe Co., Birmingham, died Nov. 20 after a long illness.

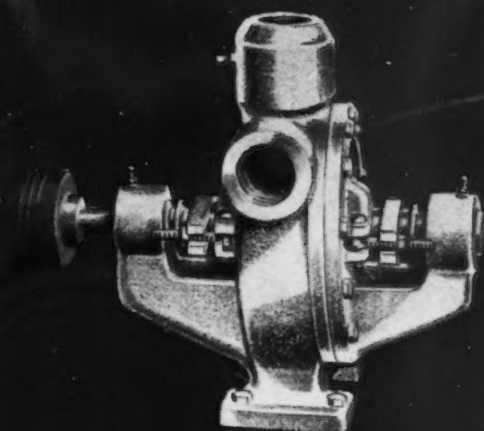
• **Walter C. Weidig**, president of Suburban Welders Supply Co., Newton, Mass., died Nov. 19.

• **Charles E. Stephens**, who until his retirement in April of 1945 was a vice-president of the Westinghouse Electric Corp., East Pittsburgh, died Nov. 19. Mr. Stephens joined the Westinghouse Co. as an apprentice in 1900.

...OBITUARY...

• **Martin A. Blinn**, 48, district purchasing agent of American Steel & Wire Co., Worcester, Mass., died Nov. 13.

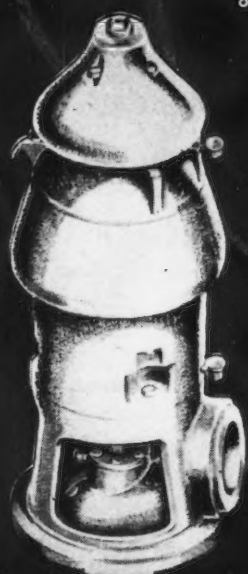
• **Arthur Greenwood**, 54, supplies controller for the British firm, David Brown Sons (Huddersfield) Ltd., died recently. He had been associated with the firm since 1927.



THE WESTCO LINE of precision-built pumps: unique advantages in long-life and varieties of use for small-capacity pumping of all types of liquids. High heads, low speeds.



FAIRBANKS-MORSE split-case centrifugals are first in their class for sustained high efficiency.



FOR VERTICAL TURBINE WORK—the complete line of Fairbanks-Morse and Pomona turbine pumps. At home—and well-proved—in farm or factory.

Impartially Yours . . . for lower cost fluid-handling

When you are after lower cost liquid-moving, you want 100% impartial advice from men with second-to-none records of applying the right pump to all types of water-handling jobs! For this kind of engineering service—and for a complete line from which you may choose—there's no substitute for Fairbanks-Morse. Here's a single source for all your centrifugal, turbine, and special pumping needs—one "pump store" to simplify your pump-selection and servicing problems to the vanishing point!

IF YOU'RE AFTER any of these advantages, see your Fairbanks-Morse dealer or call the nearest Fairbanks-Morse office.

FAIRBANKS-MORSE

A name worth remembering

DIESEL LOCOMOTIVES • DIESEL ENGINES • MAGNETOS • GENERATORS • MOTORS • PUMPS
SCALES • STOKERS • RAILROAD MOTOR CARS and STANDPIPES • FARM EQUIPMENT

Dear Editor:

DIE LUBRICANT

Sir:

On "Newsfront" of the Oct. 17 issue, there is an interesting reference to a compound developed by Curtiss-Wright for use on the surface of forging dies. We have read the article entitled "Forging Costs Cut by Improved Die Lubricant," on p. 55 and would like to have complete information in regard to the ingredients of this mixture. Can this compound be used on the upper and lower sides of forging dies or is it merely for use in punching and trimming forgings? Where can we purchase 300 mesh graphite and the . . . "mid-continent oil with a viscosity of 135 at 1000°F?"

D. CLAPP
President

E. D. Clapp Mfg. Co.
Auburn, N. Y.

● Author Pistoles advises that the improved die lubricant referred to in this article is a product made by the Hodson Corp., Chicago, and is known as the No. 800 series forging die compound. The oil is developed on the basic principle that regardless of what oil is used (even heavy cylinder stock which may cause excessive smoke) the heat would be great enough to flash and consume it. This refers to normal operations, but there are occasions where heavier oils can be used satisfactorily. However, if the oil is heavy enough to retard the action of the heat a certain amount of carbonaceous, gummy substance may result and build up on the die. In the manufacture of the compound, the company uses a very light, volatile, low fire and flash mineral oil which is processed in a colloidal structure, increasing its body and resulting in a vehicle which will carry a large percentage of very fine mesh graphite. This prevents sludging or separation of the product even though it is forced through spray lines under pressure. It seems that this product could be used satisfactorily by swabbing or spraying on both the upper and lower dies, either in punching or trimming. The viscosity of the oil is 135 at 100°F.—Ed.

TUBE FORMING

Sir:

About four years ago I read in your magazine an article by Westinghouse Electric Co. on the spinning of ends of tubing. Would appreciate it if you could send me a copy of this article.

A. LYDING
Production Enterprises, Inc.,
Brooklyn

● The article sounds like "Induction Heater Speeds Tube Forming," which appeared in the Sept. 23, 1943 issue. A tear sheet of that article is being forwarded.—Ed.

ZINC OXIDE IN AUSTRALIA

Sir:

We notice on p. 112 of the July 11 issue reference to price of zinc oxide having risen by \$38.08 per ton which indicates that the price in your coun-

try must be high. We have oxide from our galvanizing process for which we get very little in this state. At present we are prohibited from exporting it, but this may alter later, and we would be pleased if you could give us the names of any concerns who handle zinc oxide.

G. CLARK
Secretary

W. A. Netting & Wire Co., Ltd.
Perth, Australia

● Zinc oxide is used principally in the manufacture of rubber, paint and pharmaceutical products. We are forwarding a list of concerns who may be interested in your suggestion.—Ed.

WAGE GUARANTEES

Sir:

I have noted a recent reference to the following articles which appeared in your magazine, dealing with the annual wage question: "Annual Wage and Wage Guarantees," Nov. 8, 1945, p. 142; "Compulsory Guaranteed Wages," May 17, 1945, p. 103. I should like to obtain copies of these issues or reprints of the articles, if such are available.

J. R. SMITH
Industrial Relations Dept.
Pittsburgh Plate Glass Co.
Pittsburgh

ALUMINUM SOLDER

Sir:

In "Newsfront" of the Oct. 10 issue, an item announces an aluminum solder that can be applied at temperatures low enough to use gas or electrically heated soldering irons. Could you give us the name of the concern that has made this development? We are interested in such a solder for use in producing patterns for our foundry.

W. C. CHENEY
Vice-president
Gillet & Eaton, Inc.
Lake City, Minn.

Sir:

... Will you be so kind as to let us know how we can get further information on this long awaited development?

ALBERT STOUKERS
Precision Sheet Metal Works
Tucson, Ariz.

● The manufacturer is Pittsburgh Metals Purifying Co., 1352 Marvista St., North Side, Pittsburgh.—Ed.

PACKAGED PROCESS PLANT

Sir:

A few weeks ago you reported on a new business venture in California having for its object the organization of a "packaged process plant" for export. If I am correct the founders of the organization consisted of a group of young business men and engineers, and had in mind business with Venezuela. I tried to contact them but

the letter was returned. Would it be asking too much of you to reforward my original letter to the proper address?

A. S. WOLFNER

20 Braemore Rd.
Brookline, Mass.

● Our West Coast editor has delivered your letter to Capt. C. F. McDowell of Intercontinental, 110 Market St., San Francisco, an executive of the group.—Ed.

CHROMITE REFRACTORIES

Sir:

I am interested in a series of articles by J. H. Chesters, "Chrome Ore and Chrome Magnesite," which appeared in the issues of Nov. 11 and 18, 1943, and would like to receive reprints or tear sheets if available.

WALTER H. EAST

76 Grand St.
Reading, Mass.

● Our reprint supply has long been exhausted, but we understand Mr. Chesters, United Steel Companies, Ltd., Stockbridge, Sheffield, England, published these articles in a book.—Ed.

INQUIRY FROM GREECE

Sir:

In the issue of June 27, pp. 65-66, appears a manual stud welder. Will you kindly let us know the maker of this tool?

G. MALTSINIOTIS & CIE S.A.
Athens, Greece

● The stud welder discussed in that article is manufactured by Nelson Specialty Welding Equipment Co., San Leandro, Calif.—Ed.

TORQUE VALUES

Sir:

We would appreciate receiving tear sheets of the article, "Torque Values for Standard AN Bolts and Nuts," found in the Oct. 10 issue.

O. HELD
Technical Secretary
Stover Lock Nut & Machinery Corp.
Easton, Pa.

PERMANENT MOLD CASTINGS

Sir:

Please send me the bibliography on permanent molds, compiled by H. E. Bourassa.

C. CRAWFORD
Metallurgist
David Bradley Mfg. Works
Bradley, Ill.

● You are lucky, Reader Crawford, we are mailing you the last copy available.—Ed.

COMPARABLE TOOL STEELS

Sir:

I shall appreciate your sending me two copies of the "Comparable Tool Steel Chart," which I understand is available.

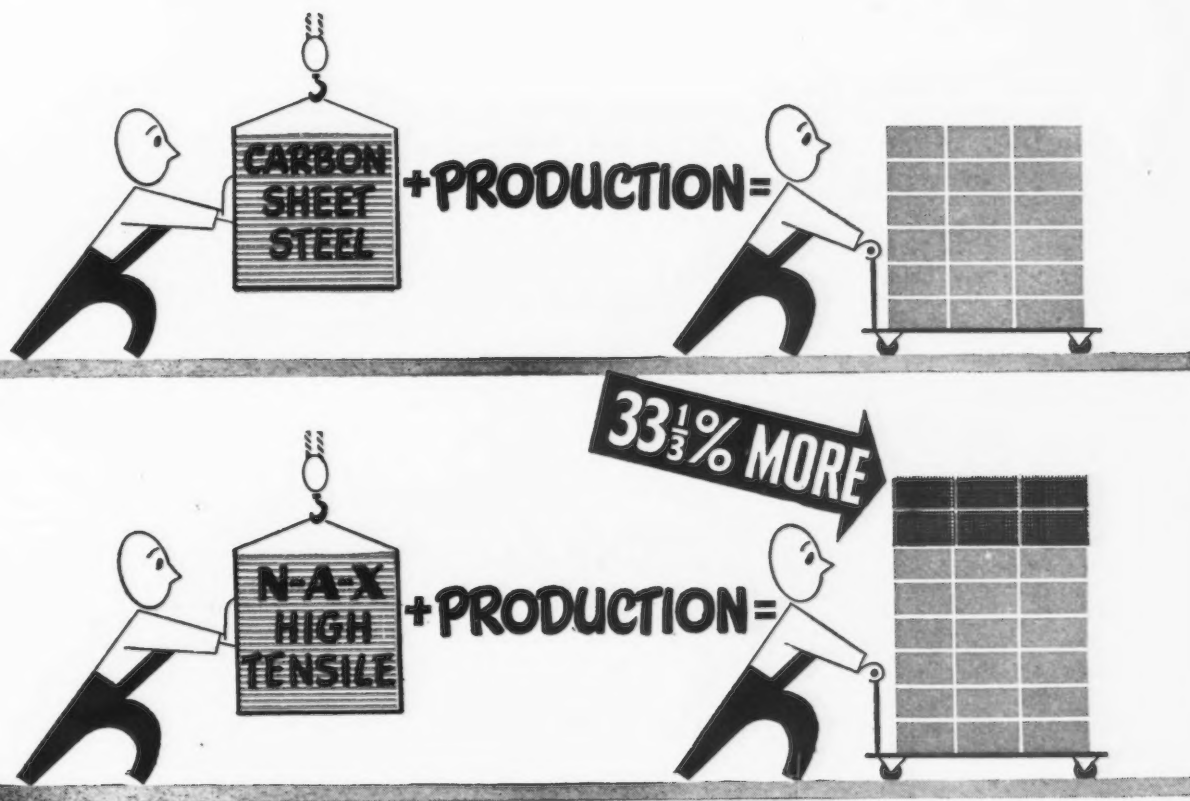
R. C. HURT
Sales Manager
Tanner & Co.
Indianapolis

● Two copies have been mailed to you. The chart is available at 15¢ per copy.—Ed.

THE NEW ARITHMETIC IN STEEL

In production per ton—

1 ton N-A-X High-Tensile = $1\frac{1}{3}$ tons Carbon Sheet Steel



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THE new arithmetic in steel is as simple, understandable—and as well worth remembering—as the multiplication tables.

N-A-X HIGH-TENSILE permits the use of lighter sections—as much as 25% lighter. Less steel is used per unit; more units are produced per ton. Yet finished products actually are stronger and more durable—thanks to the greater strength and toughness, the greater resistance to fatigue and corrosion, of N-A-X HIGH-TENSILE steel.

N-A-X HIGH-TENSILE also has excellent weldability, and can be cold-formed and deep-drawn to exceptional degrees for a high-strength steel.

The tremendous demand for N-A-X HIGH-TENSILE makes it impossible right now to promise normal delivery on new orders. However, our engineers will be glad to show you how to make the most of the new arithmetic in steel in figuring your plans for the future.

MAKE A TON OF SHEET STEEL
GO FARTHER

Specify—



GREAT LAKES STEEL CORPORATION
N-A-X ALLOY DIVISION • DETROIT 18, MICHIGAN
UNIT OF NATIONAL STEEL CORPORATION

THE IRON AGE, December 5, 1946—113

Industrial News Summary . . .

- **Operating Rate Declines to 61 Pct**
- **Further Steel Price Changes Due**
- **Rail Embargo Would Be Heavy Blow**

THE steel industry is not yet flat on its back, some popular opinion to the contrary notwithstanding. A considerable quantity of steel is still flowing from the country's openhearth and rolling out of its mills. This week the nation's steelmakers set their operations at 61 pct of rated capacity, equal on an annual basis to 63 million tons of steel. Except for 1929 when 63,205,490 tons of steel for ingots and castings were produced, this is more steel than the industry ever made in its history prior to the war.

But because it comes at a time when demand is heavy and when some balance between that demand and available supply was actually in sight, the coal strike is dealing a nasty blow to the metalworking industry. The loss of more than a million tons of steel will find many fabricators with unbalanced inventories. Despite the fact that they have steel on hand, the shortage of some critical items will force shutdowns soon.

EARLY this week no major steel producer had announced any price changes, but changes there will be and they are due soon, in the opinion of several industry sources. A number of the smaller mills announced changes in extras during the past three weeks, and no matter what they are called they mean higher costs to the fabricators and eventually to the ultimate consumer. Further indication of the price trend was the revision of extras and an increase in the base price of steel sheets announced by at least one company early this week.

A second producer of merchant pig iron, this one in Pittsburgh, has moved his price up by \$2 a ton. Faced with higher "extra" costs, bolt prices were also advanced and an increase on tinplate is reported to be in the air. The rise in nickel announced last week may be reflected in higher base prices for those steel alloys using nickel, including stainless steel, although the bulk of the price rises expected in the very near future will most probably be in the form of a revision of extra charges. A survey of steel consumers made by one of the larger mills is reported to show little unfavorable customer reaction to a price increase. Higher prices are now regarded as almost inevitable.

Even assuming that the freight embargo which railroad men feel is due this week can be somewhat deferred, steel officials predict a sharp decline in output if the coal strike lasts a few more weeks. Bars and plates, they indicate, will be the first items to go out of production but mills will strive to maintain output of light gage flat-rolled products, including tinplate and galvanized sheets, as well as cold-finished bars and pipe.

The steel pipelines are pretty well filled on sheets, cold-finished bars and pipe, and they show a higher profit return to the producers. However, some opera-

tors have pointed out that tin mills consume too much gas and some tin mill schedules will have to be slashed if the crisis lasts another week.

But steel operators are not discounting the probability of a rail freight embargo this week. Should it come it would practically stop shipments from the finishing mills. Steelmakers would then continue to run their melting and semifinishing operations in an attempt to stock as coal supplies will permit. However, many mills would soon reach the saturation point on this, exhausting available storage for semi-finished steel within two weeks.

PRESENT plans call for further gradual shutdowns this week and drastic cut-backs next week if no signs of a settlement appear. It appears that the freight embargo would have struck last week had it not been for some disagreement in Washington on the prescribed method for enforcing it.

Perhaps the only factor that might hold off the freight embargo is the possibility that Lewis and the operators are closer to agreement than appears on the surface. It is reported that only the running time of a new contract between the operators and the union is still under discussion. Lewis, it is said, wants it to run until April 1948; the operators would settle for a 48-hr pay for a 40-hr week, but the contract would expire at the end of 1947.

While Philip Murray was carefully adding bricks to his steel wage structure, John L. Lewis was cutting the ground out beneath one corner of it. Mr. Murray announced plans to "go all out" for higher wages on the basis of "excessive corporate profits," and the guaranteed annual wage issue was taken out for another airing. But steel company profit sheets are certain to reflect the cost of a long coal strike and Mr. Murray's main argument may be considerably weaker next year.

This week's ingot operating rate of 61 pct of rated capacity represents a drop of three points from last week's revised rate of 64 pct. The revision of last week's rate was necessitated by subsequent revision of openhearth schedules set up earlier in the week.

Washington sources report that the Civilian Production Administration has been considering canceling priority ratings on steel products. The subject was up for discussion before the miners went out, and it is understood that only the bitter opposition of Housing Expediter Wyatt prevented issuance of the order at that time. It is recalled that priority ratings were discontinued during the last series of strikes and similar action is believed imminent again. But, if housing steel comprising the bulk of the domestic priorities is retained under ratings or reinstated at the end of the strike, the effect of the discontinuance will be negligible.

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PER CENT OF CAPACITY

Nov
Dec

• **BREACH OF CONTRACT**—Local B 136 of the International Brotherhood of Electrical Workers (AFL) acknowledged union liability for breach of contract in its case with Pullman-Standard Car Mfg. Co., in the U. S. District Court of Birmingham, Ala., on Nov. 23. The union agreed that its no-strike agreement with the company was binding and admitted its liability for breaching it, including financial responsibility, under the Alabama law. Pullman-Standard had charged in a damage suit that the strike violated the contract. The company in consideration of the acknowledgment by the union of its responsibility settled its \$250,000 suit for \$1 and payment of all court costs by the union.

• **FREIGHT CAR OUTPUT SAGS**—Freight car builders for the month of October produced only 3828 units compared to 4016 units in September. New orders have also dropped off with 3407 received during October as against 12,737 received in September. The total domestic freight cars on order as of Nov. 1, was 45,527.

• **CONSTANT REVISION**—As of a few weeks ago, the automobile makers had contemplated 5 million cars and trucks for 1947, 3,750,000 of which were to be passenger cars. At that time large volume production was not expected until after the second quarter. Six months was the time allowed to overcome shortages and their production figure was on this assumption. With decontrol of prices which set them free to negotiate for materials, they later raised the production goal to 5,750,000 units. In order to make this quota they figured large-scale production would be attained by the end of the first quarter and that enough bottlenecks would be broken to permit 500,000 cars and trucks per month by April or May. Following the coal strike the figures are again up for revision but the auto makers have decided not to make any more predictions until the wrangle over coal, steel and the wages in their own industry settles down.

• **COST TOO HIGH**—DuPont has tabled temporarily its plans for \$75 million in additional construction at many of its plants. The prevailing high cost of construction work and the shortages of structurals, concrete bars and other members are understood to be the reason for postponing the program.

• **MAINTENANCE UP**—The cost of keeping steel plants and their equipment in good running order rose during 1945 to a record figure of slightly more than \$542 million, according to the American Iron & Steel Institute. The increase over 1944, a jump of about \$3 million, marked the seventh successive year in which housekeeping costs within the industry have risen over the previous year. Some of the money that was to have been spent in 1946 for an anticipated \$327 million expansion program for the industry has been diverted, instead, to repairs and maintenance of facilities that cannot be replaced because of material shortages.

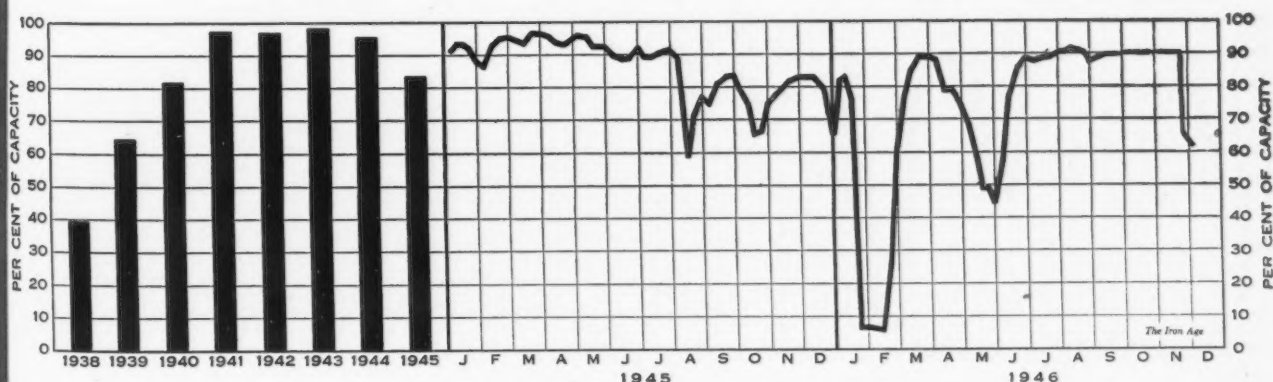
• **GEAR SALES UP**—The gearing industry, as represented by the members of the American Gear Manufacturers Assn., shows an increase in volume of sales for October 1946 as compared with September 1946 of 16 pct. This report does not include turbine or propulsion gearing. The index figure for October 1946 was 397.

• **MORE DELAY**—The new 54-inch strip mill being installed by Bethlehem at Sparrows Point, will be ready April, 1948, with the exception of the all-important electrical controls and some motors. The strike bound Allis-Chalmers plant has the contract for this equipment and will be unable to make delivery as planned. Efforts by Bethlehem to get other producers to supply this needed equipment have not been successful so far, it is reported.

• **RULING CLARIFIED**—Reports that they have been refusing to sell customers without ratings have prompted CPA to announce that suppliers of building materials subject to HH priority ratings are not prohibited from selling these materials on unrated orders. Suppliers are said to have been under the mistaken impression that CPA regulations required them to hold their whole supply for rated orders for materials for the Veterans' Housing Program.

• **LABOR DATA**—Our early rates for the manufacturing industries have outstripped the rise in the cost of living since 1939, according to the U. S. Bureau of Labor Statistics. According to BLS the average hourly rate has increased 72 pct since the outbreak of the war in Europe; during the same period the consumers' price index has increased approximately 45 pct. Five million man-days were lost during September as a result of labor disputes, compared with 3.3 million in July and 23 million in February. Total man-days lost during the January-September period are placed at 98,225,000.

Steel Ingot Production by Districts and Per Cent of Capacity



Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	West	Ohio River	St. Louis	East	Aggregate
November 26...	52.0*	74.5*	52.0*	52.0*	94.0	55.5*	84.0	78.0*	104.5*	77.0	99.0	60.0	75.0*	64.0*
December 3....	52.0	76.0	41.0	46.0	99.0	55.5	75.5	41.0	103.0	75.0	99.0	60.0	70.0	61.0

* Revised.

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ALUMINUM PERMANENT MOLD, SAND and DIE CASTINGS...HARDENED, GROUND and FORGED STEEL PARTS

How to Cut Schedules Is Steelmakers' Problem

Pittsburgh

• • • Operating steel mills on a curtailed basis is never a matter of just shutting down steelmaking furnaces and distributing the steel that is produced on a pro-rata basis upon total production. Problems akin to curtailments are many, and steel mills have to carefully examine production schedules in the light of what can and cannot be made rather than on the premise that production will be scaled down by mathematical percentages.

Foremost to be considered is the fact that finishing mills, many of them at least, can't be operated on a part-time basis. First, it would cost too much and, second, because the problem of labor supply and efficiency becomes acute when operations are part time. Also highly important is the type of steel that will be available under a reduced steelmaking schedule. It is axiomatic that steel quality begins to slip when operations are curtailed. Consequently, finished product schedules requiring high quality steel might fall behind because the steel made is not up to quality. Plans then become paper only.

Another factor, and quite important, is the ability of the mills to operate certain finishing equipment that is dependent upon other operators for materials other than steel. As an example, the curtailment of coke production, directly the result of a coal shortage, may eventually necessitate the curtailment of sheet, wire, or pipe production because of the lack of coke oven gas that is required for fuel for the heating of ovens and other equipment in the sheet mill. The available coke oven gas must be used to keep non-operating coke ovens hot, some is used in openhearth, and considerable is used in heating various steel treating furnaces throughout the plant.

Steel observers anticipate that, barring a rail embargo, when shipments of steel products begin to fall off in one category, it will be only a matter of days until they drop sharply in practically all categories. Mills, for the most part, are anxious to maintain high

By THOMAS E. LLOYD
Pittsburgh Regional Editor

• • •

production of light flat-rolled items, hot and cold-rolled sheets, tinplate, and galvanized sheets. Mill pipelines are pretty full of steel, and effort will be directed toward keeping the flow of steel moving into flat-rolled channels. Plates, on the other hand, will probably be among the first to disappear from the market.

Hot-rolled bar production will probably be curtailed first, and the demand for these products is among the greatest. Rods, likewise, are in the same position as hot-rolled bars. Production has already been curtailed in this district to some extent, and further curtailments this week are anticipated.

A curtailment of high quality wire products, such as spring wire, rope wire and fine wire, will come only as a result of the steel

quality. On the other hand, such a condition will tend to maintain high production of other items such as nails and fencing.

Pig iron production, of course, was the first hit, and those integrated companies that had pig iron for sale in addition to the basic iron needed in steel production, have already cut off such sales. Greater dependence upon scrap for higher operations is impossible because of the critical shortage of scrap, and thus the need for pig iron is made more acute at this time.

Semi-finished steel, such as slabs, billets, forging ingots, tube rounds and skelp, products sold by fully integrated companies to less integrated companies for further conversion, are beginning to move off the market. Thus, a general tightening up in all products dependent can be anticipated immediately. For example, butt and lapwelded pipe and special tubing producers will have to curtail out-

Sabotage



put because of the inability to get skelp, and many requirements for standard pipe or specialty tubing will go wanting for pipe. Forge shops will be unable to get forging ingots and end product manufacturers will go wanting for shear knives, die blocks, roll sleeves, shafting, gear blanks, tailor made forgings, and a multitude of other such heavy items. Slabs and billets end up in an astounding list of end products, so the shortages caused by these products will hit manufacturing industries throughout the country in every phase of the metalworking field.

On the more pleasant side, however, observers feel that mills will protect as much as possible their output of light-gage flat-rolled products. Oil country pipe from the major producers likewise seems to be an item that will be among the last to be hit by decreased steelmaking operations. Cold-finished bar output will be protected, even at the expense of hot rolled bars, in such cases where the hot rolled bar producers also make cold finished bars.

Because the demand for structural items is so great, even with an effort on the part of the producer to continue as long as possible the production of these products, the amount forthcoming will become more and more insignificant. However, structurals should be in better supply for a while than such items as bars or plates.

In addition to the physical aspects of mills operation and the

problems accompanying a curtailment of operations at this time, the economics of production must never be forgotten. Quite obviously, the steel industry will attempt to throw raw steel into product lines that are the most profitable. This accounts to some degree for the desire to maintain flat-rolled and cold-finished bar output and certain other highly finished products. The economics, however, must be balanced against the physical ability to produce them, because there are major problems. Typical are those noted of getting coke oven gas for operation of heating furnaces in a sheet mill and steel quality.

Cleveland Industry Will Be Down Within Month if Strike Holds

Cleveland

••• Barring an unforeseen immediate settlement of the coal strike, the iron and steel industry in this area, major steel producers, foundries and fabricators, will cut operations to a virtual halt within the next 4 weeks.

Major steel producers have enough coal at this time to last until the first of the year at present operating rates, which are expected to decline somewhat further in a last ditch effort. Republic's overall operations are running about 60 pct, and they expect to hold about that level until Jan. 1. J. & L. has had no

A protracted coal strike should see steel production fall to levels comparable to those of early this year when the coal and steel strikes hit the industry. A month of coal strike should do it, according to observers here. A quick end of the strike will see steel output climb back up to pre-strike operations, but after a prolonged strike the comeback will be slow and not too steady. The negotiations of a new USWA-CIO steelworkers' contract will have a major bearing on the comeback of the industry after a long coal strike and may even postpone full comeback until after the new contract is signed.

curtailment at all at Riverside as yet and American Steel & Wire has two blast furnaces banked and expects to take one off completely by this weekend. The worst shortage is in Youngstown, where operations are hovering around 35 pct.

Within the next 3 weeks, many gray iron foundries will be closed for lack of coke or pig iron. Closing of the foundries will affect the machine tool industry within 2 or 3 weeks. A number of fabricators, for lack of steel, will also shut down within a month and past progress toward a return to balanced inventories will have been rolled back again.

Already the coal strike has brought the steel bootleggers back into play and steel is being offered some fabricators here at the bargain price of 10¢ per lb.

Most of the stamping industry will be able to stave off the effect of the strike at least until the first of the year, and many until the first of February, at which time, if there has been no settlement, the industry will go down with a very definite thud.

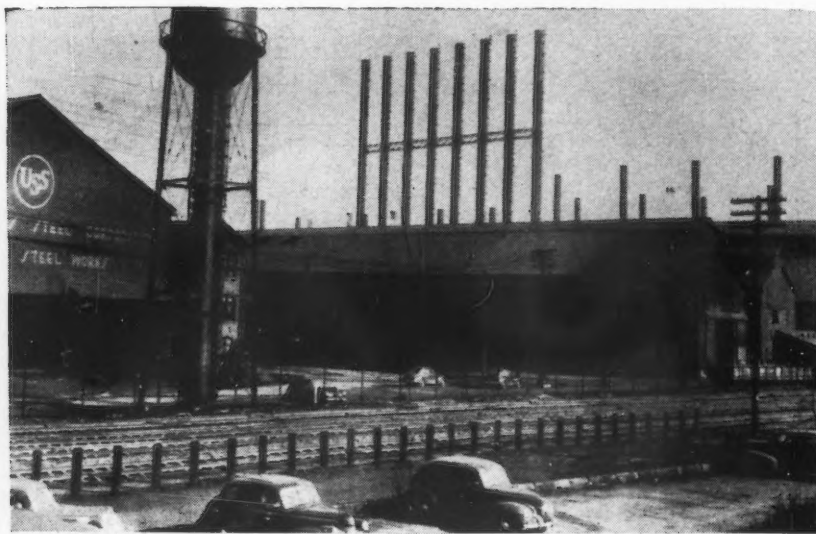
To Sell \$1 Million Foundry

Washington

••• WAA has announced that a \$1 million steel foundry in Crum Lynne, Pa., having a rated capacity of 6000 tons per year, is available for sale or lease. It is suitable for production of gray iron castings.

The plant, operated during the war by the Atlantic Steel Casting Co., has been under lease since December 1945, to the Chester Electric Steel Co., which is voluntarily discontinuing operations.

GLOOMY PICTURE: Parking lots were all but empty and only a few wisps of smoke curled from these stacks of the Homestead Works of Carnegie-Illinois after the corporation cut back to 35 pct of rated capacity last week.



Steel Fabricators' Supplies Vary; Freight Embargo Seen As Terrific Blow

By D. I. BROWN
Chicago Regional Editor

Chicago

• • • Estimates of how long steel consumers can continue to run, if the coal strike forces producers completely down, vary directly with inventory. Even in cases where steel inventories are ample for continued production of 2 months, the possibilities of Schedule III of CPA or the rail embargo being enforced, would clamp the lid on all production here in a matter of weeks. The recent move by railroads and producers of power and goods to oil power although extensive, is not large enough at present to offset a general stoppage of production if the strike continues.

Producers of critical items such as tin containers for foods and medicinal purposes, will be given every consideration. Continental Can Co. reported that there is sufficient tinplate on hand at the north side plant to continue work for 45 to 60 days. Curtailment of B and C items, such as containers for paint, waxes, insecticides, etc., will be cut first. Makers of tinplate say they will continue the output as long as possible but as the tinmill is the last consumer of gas the coal shortage will force early curtailment.

At the moment, steel producers are shipping 100 pct of all items made and as the mills go down they will select units producing critical items and run them as long as possible. Sheets and small bars will be given a break, with rails, plates, wheels and axles, and structurals suffering. No matter what the product, production hinges on blast furnace operations and these units are being taken off very fast. If sufficient scrap were available the open hearth charge could be adjusted and the mills could hang on a little longer but scrap is very short.

Makers of farm implements are behind the eight ball on all items needed for production. Deere & Co. report large cutbacks will have to be made by the middle of next

week. Pig iron is short and two merchant furnaces in this area are already banked with others cutting back. Cast scrap is so scarce that there is no cushion. Massey-Harris Co. in Racine, Wis., have enough sheets for 4 to 6 weeks' operation but lack of pig iron will stop their wheels turning in 2 to 3 weeks. The foundry which received the November allocation of coke doesn't know what it can expect in December.

Some manufacturers say they can continue by making the parts for which they have materials but that the output of 100 pct finished goods will stop within 2 weeks. Others report unbalanced inventories of component parts are so bad now, that if they can't make the finished product they may as well close. International Harvester Co. is in a bad way on sheets at the two motor truck assembly plants at Ft. Wayne, Ind., and Springfield, Ohio, and the refrigerator line at Evansville, Ind. All of these plants will effect immediate curtailment this week as the steel producers start decreased

sheet deliveries. The engine plant at Ft. Wayne has a 5 to 6-day supply of castings ahead, but the coke shortage is expected to whittle this down to zero within a week or two as the foundries shut down.

Users of sheet alone, such as Modern Steel Co. in Geneva, Ill., makers of steel cabinets and similar items, can last two weeks. Others report from one to three weeks' supply depending on mill shipments that are due. The surplus supply of sheets that some interests have had in storage, and which were offered for sale in this area a few weeks ago, has been for the most part gobbled up and companies aren't as interested in paying premium prices since they can't see uninterrupted production ahead.

Executives of the large Chicago Western Electric plant report that they have on hand a 60-day supply of silicon sheets, copper wire and castings and if no embargo appears they can continue with the products made from these materials for that time. Short supplies of chemicals and plastics at this plant, however, which come from the East, may force production to a halt by the second week in December. Coal stocks at Western Electric are sufficient for 5 or 6 weeks but here again Power Schedule III may curtail power output and hence operations before then.

Builders of railroad cars, who have been suffering under mate-

CARS TO SPARE: It's either feast or famine this year in the railroad car supply picture. The coal strike has run the figures on "empties" up higher than anyone cares to contemplate.



rial shortages and pent up demand, won't be able to keep production up very long. Champ Carry, president of Pullman-Standard Car Mfg. Co., estimated their Michigan City freight car line might be able to go 5 to 10 days but, "it was anybody's guess." This line is producing 18 cars a day and Mr. Carry told THE IRON AGE that different bottlenecks keep cropping up every week and manufacturing schedules have been in a state of constant revision. The production of the French export cars may continue a little longer as this special equipment and material was ordered earlier and fair stocks are on hand as Pullman has been concentrating on domestic cars.

The A. O. Smith Co. in Milwaukee, large consumers of sheet,

plate and rods, report that at best they can continue production from 3 to 10 days. Because of huge tonnage used in daily production this plant cannot depend on inventory but rather must have continued large receipts from the mills. Already the small cutback on rail deliveries has started to affect their production and a general embargo would mean an immediate blackout of their operations.

Opinion in this area is tempered by many factors. On the whole, most companies are fearful of a general freight embargo, which is the blackest cloud on the horizon. Every attempt will be made to keep as many people on the payrolls as possible but the whole situation is touch and go with nobody able to solidly plan more than 24 hr ahead.

Detroit Forging And Stamping Shops Begin To Feel Strike Effects

Detroit

••• The coal strike is expected to have an immediate effect on the operations of a number of stamping plants and forge shops in the Detroit area. Supplies of sheet steel and carbon bars have been on a hand-to-mouth basis for many months in many of these shops and the fact that three steel suppliers in Detroit are reported to have already stopped deliveries will have an immediate effect on such operations.

Operations of forge shops will greatly depend on the kind of work done and the inventory now available. Forge shops producing dies and composite forgings made of alloy steel will be unaffected

for some time.

On the other hand, production shops requiring both alloy and carbon bars may face a shutdown within a few weeks because of the shortage of carbon bars. It is reported that in some instances steel suppliers have been allocating alloy steel in relation to carbon steel. One prominent forge shop has reported inventories of alloy steel may last until midsummer while less than 30 days' supply of carbon steel is on hand.

Many Detroit plants including Ford and Chrysler closed down over the long Thanksgiving weekend for the announced purpose of conserving fuel. It might be added that the producers were just as anxious—if not more so—to save steel which promises to give out sooner in Detroit than the coal supply.

STORM CENTER: This is the prefabricated house built of structural steel and using porcelain enameled sheet walls which Lustron, Inc. wants to build in the Chicago war plant Preston Tucker has leased for motor car construction. Some say the plant is big enough for both projects.



Olds Says Operations At U. S. Steel Plants Face Virtual Shutdown

Birmingham

••• Our stocks of coal are almost non-existent, Irving S. Olds, chairman of the board of directors, U. S. Steel Corp., declared in an address celebrating the Diamond Jubilee of the founding of the city of Birmingham, held at Birmingham Civic Auditorium. "Operations in some of our steel mills have already been materially reduced and will soon come to a virtual standstill, if this stoppage of coal production continues," he said.

"From the standpoint of the economy of the nation, this is a disastrous turn of events, coming at a time when prospects for the future were bright for all segments of society. During the third quarter of 1946, U. S. Steel's operating rate was in excess of 94 pct of its ingot capacity. Last month it established an all-time peacetime record for 1 month's steel shipments.

"During this period of high demand, U. S. Steel Corp. has tried to be fair to all of its customers wherever located. All have been treated on exactly the same basis. The truth is we have not had enough steel to go around for all who would like to buy. The tightness in steel supply has been as simple as that. The scarcity is certain to become much worse with the steel mills of the nation down, or operating at much reduced rates.

"At a birthday party such as this, I am reluctant to appear to be gloomy or discouraged. In fact, I have faith that before long the common sense and reasonableness of the American people will have its effect on the present catastrophic impasse. This is the eighth complete coal shutdown in the past 4 yr—one each 6 months on the average. It may sound trite to say that the public interest is paramount.

"Still this nation, if it is to survive, must continue to be one of law and order, where neither one man nor one group can be allowed to put selfish interests above the national welfare, or indefinitely to paralyze the business activity of the country, unless right and justice are closely on his or its side."

Weekly Gallup Polls . . .

Public Favors Law to Prohibit Strikes and Lockouts

Princeton, N. J.

• • • A good many Americans are weary of industrial strife which has retarded production since the war's end.

As the country appears to be moving toward another series of crippling strikes, with John L. Lewis and the soft coal miners leading off, the public would like to see the whole show called off, according to George Gallup, director, American Institute of Public Opinion.

Voters would like to see a truce between labor and management for a year. In fact, half of all voters in a recent survey favor the idea of passing a law to forbid all strikes and lockouts for a year.

Basil Manly, former member of the Federal Power Commission, has recently suggested that labor and management enter into a voluntary agreement to prevent strikes or lockouts in this country during 1947, with allowance made for arbitration, wage adjustments, etc., during the year. Bernard Baruch last spring also urged similar action by labor and industry.

In testing sentiment on the issue among a representative sample of the U. S. voting public, the institute had field reporters ask:

"Do you think a law should be passed forbidding all strikes and lockouts for a year?"

	Pct
Yes	50
No	41
Undecided	9

While passage of such a law is not necessarily the only means of bringing about a period of labor-industry peace, replies to the question are indicative of the extent to which a strike-weary public is willing to go to usher in a period of uninterrupted production.

There is additional evidence that the public in this country is fairly well fed up with the failure of labor and industry to move into large-scale production.

A poll of the nation just before the elections indicated a clear

mandate for the new Congress to pass new laws to control labor unions.

The institute asked:

"Should the Congress elevated in November pass new laws to control labor unions?"

	Pct
Yes	66
No	22
Undecided	12

Other surveys from time to time on various aspects of the labor-industry picture have brought out that the public favors:

(1) Prohibiting strikes in public utilities such as gas, electric, telephone, and local public transportation companies.

(2) A 30-day cooling off period before any strike can be called, with investigation of the issues during the waiting period. This was proposed by President Truman.

(3) Compulsory arbitration of labor disputes if labor and management cannot come to agreement by themselves.

(4) Eliminating "feather-bedding" practices in labor unions.

(5) Having labor unions make financial accounting periodically on income and expenditures.

(6) Having a citizens community arbitration board (labor, management, public members) to settle local labor disputes—along the lines of the Toledo Plan.

The public, it should be noted, is not basically anti-union. Surveys have shown a majority of the U. S. public favoring the principle of unionism. The public has approved the right of a man to join a union if he so chooses.

The public has also been found on labor's side, at least in the matter of wage adjustments, in some of the strikes last winter.

But, as of today, there can be little doubt that the great majority of the people would like to see an end to labor-industry conflicts in the interests of a prosperous, producing economy.

• • • Nov. 5 was a very happy day for the Republicans this year.

Present Analysis of Voting Shows Very Bright Outlook For GOP in 1948 Elections

o o o

They outdid the Democrats in every major type of office the voters were asked to cast ballots on.

They elected 246 Representatives in Congress, to 188 for the Democrats.

They elected 23 Senators, to 13 for the Democrats.

They elected 20 governors, to 14 for the Democrats.

The Democrats have one thing to be thankful for. The biggest political prize, the presidency, was not at stake.

Of course, if this had been a presidential year, the number of voters would have been far greater than the roughly 34 million who cast ballots recently. It would probably have totaled upwards of 50 million. And past experience has shown that other things being equal, the larger the turnout, the better the Democrats do.

Even so, the Republican lead piled up Nov. 5 is decisive enough to indicate that they would still be the stronger party even though the turnout were up another 15 million or so.

All in all, it looks as though the Democrats are going to have a rough time of it in 1948, unless major shifts in political sentiment take place in their favor between now and November 1948.

These statements and the figures in the table below are based on analysis of returns to date from all over the country, some of which are not entirely complete.

It is possible by taking this year's Congressional results to see approximately how Republican and Democratic presidential party strength shapes up in each of the 48 states.

What the analysis indicates is
[CONTINUED ON PAGE 154]

Government Report Revives Annual Wage Issue

New York

• • • The guaranteed annual wage, called an impractical pipe dream by many metalworking executives, was again pushed into the public eye by the Government late last week. An interim report by Murray W. Latimer released on Nov. 30 asserts that a guaranteed annual wage to workers would help stabilize the national economy.

Even in seasonal industries, Mr. Latimer's findings held, the employer's wage costs would not be increased by more than 6 pct if the guarantees were coordinated with the present state unemployment compensation plans.

The government's study grew out of the 1944 steel wage case at which time the United Steelworkers of America (CIO) applied so much verbal pressure for a guaranteed annual wage that while the War Labor Board turned the union down it recommended an overall study of the subject.

The idea was first proposed by the SWOC, predecessor of the USWA-CIO, in December 1937. Philip Murray's union has been tossing the subject up before the steel companies for some time although students of union tactics doubt that he seriously intends to press for it in the negotiations preceding expiration of the present steel contracts in February of next year. In May, and again in the fall of this year, the CIO proclaimed its intention of seeking such a guarantee. Others have asserted that the guaranteed annual wage would be labor's battle cry in 1947.

The Latimer study recognizes that "the guaranteed wage system is not a panacea for the insecurity of our economic system, that it cannot in and of itself eliminate the fluctuations in the economic system. On the other hand, it is quite clear that widespread wage guarantees can make a substantial contribution to the stabilization of the economy through the stabilization of wage earner income and hence of consumer expenditures."

Recognizing that other factors must be considered, the report revealed that a companion survey as to the plans, overall economic

influence is being compiled.

Spokesmen for the CIO, which was responsible for initiation of the study, expressed some bitterness as to the date of presentation of the Latimer report on the grounds that the survey had been rushed to completion without considering "certain vital aspects." This was denied by Mr. Latimer.

While it is known that both the U. S. Steel Corp. and the USWA-CIO have been conducting independent studies on the guaranteed annual wage, economists here in New York are not surprised at the release of the Latimer phase of the OWMR study. They had in fact been expecting it momentarily.

The Latimer report not only contemplates supplementing unemployment compensation with guaranteed wage payments but states that the former could be increased to \$25 to \$30 for periods of 26 to 30 weeks. It further suggests that the government urge that state laws which now prevent employees covered by guaranteed annual wage plans from receiving unemployment compensation be modified to include them in state unemployment benefits. Amendment of the Internal Revenue Code to permit accumulation of tax-free trust funds for guaranteed wage plans was also recommended.

"For every extra dollar currently paid out in wages under a guarantee, a company with a taxable income of \$50,000 or over has its tax reduced by 38¢," the report said.

This fall the National Industrial Conference Board conducted a forum attended by economists of various research groups and universities and including representatives from U. S. Steel and General Motors. Their discussion, released on Oct. 14, 1946, cast a dark shadow of doubt on the possibilities of the guaranteed annual wage plan.

It was stated that such plans work quite nicely in certain companies whose operations are non-seasonal or which readily lend themselves to long term planning. It was pointed out, however, that those firms now in the best position to guarantee a fixed wage are

precisely those industries where such a guarantee is therefore almost unnecessary.

At the conference, Jules Backman, associate professor of economics, School of Commerce, Accounts and Finance, New York University, spoke of the guaranteed annual wage in the steel industry in 1944. "At that time, we concluded that the inability of that industry to stabilize its own demand immediately made it impossible, regardless of what willingness the industry had to adopt anything like the sort of demand which the steelworkers made then and which, according to newspaper reports, they are about to make again."

Mr. Backman added that he was amazed at the steelworkers 1944 demand equivalent to 104 weeks of 40 hr per week, with the additional assumption that any week the steelworker worked less than 40 hr. he would get 40 hr pay and any week he worked more than 40 hr he would be paid overtime.

The discussions of the group under the aegis of the conference board also touched on whether the guaranteed annual wage was not merely an extension of unemployment compensation and many of the economists doubted that seasonal industries like steel could afford the cost of such plans.

Putting his finger on the crux of the question, at least as it affects the steel industry, Bradford B. Smith, economist, U. S. Steel Corp. asked, "What is it? Are you talking," he asked, "about partial or total coverage, partial or full income? Are you talking about provisions for emergency termination of the plan by the employer? What period of times are you talking about? What are your eligibility rules for employees? . . ."

Though he was not summing up the results of the conference as an official spokesman, Garet Garrett, editor of *American Affairs*, quarterly journal of the conference board, gave his opinion of the guaranteed annual wage and indications are that it is shared by many industrial economists. Mr. Garrett said, "I think the subject runs to the history of the great delusions."

Murray Says USWA Will "Go All Out" for Higher Wages

Pittsburgh

• • • A reiteration of the USWA-CIO intention of asking for a substantial wage increase from the steel industry was made by Philip Murray, President of the CIO, at a meeting of CIO leaders on Nov. 30, in Pittsburgh. Mr. Murray told leaders that the steel workers union would "go all out" for higher wages in coming contract negotiations, but there were no indications of just what would be asked for in the way of a wage increase.

Contract negotiations, started Dec. 3 with the Aluminum Co. of America, are being watched carefully for some indication of what will be demanded by the union of the steel industry. However, the wage demands will be postponed until after Dec. 17, when the CIO wage-policy committee meets in Pittsburgh. The reasons for this, according to the union, are twofold. First, it is not the intention of the CIO to let its smallest union set or announce the pace for negotiations with the steel industry that will not be started for about another 45 days. Second, the developments of the coal strike may well have a definite bearing on the wage demands of the USWA-CIO.

While Mr. Murray did not make any specific wage demands, he asserted that the average take home pay of the steelworkers is \$13.04 a week under the average when the 18½¢ an hr increase was granted in February. He pointed to the profits of the industry, which he said had increased "phenomenally since 1939 while the real value of the wage earner's dollar has continued to drop." He claimed that business was making too much money and was a threat to full employment and free enterprise. The first indication of how much the union will seek will probably come after Dec. 17, when the wage-policy committee of the union meets in Pittsburgh. Observers in the steel industry feel that the demands will be in the neighborhood of 30¢ an hr.

In the coming USWA-CIO demands upon the Aluminum Co. of America for a contract covering 20,000 employees in 8 plants, there

is a chance that some of the affiliated demands will set a pattern for what will come in the steel industry. Among the conditions to be discussed with Alcoa, the union listed: Portal-to-portal pay, guaranteed annual wage, a welfare and insurance fund, union shop, more liberal vacations, elimination of geographic wage differentials, and improved machinery for arbitration of disputes. Some observers feel that the guaranteed annual wage and certain phases of the portal-to-portal pay demands are window dressing to appeal to both union members and the public. Whether these demands will bear any fruit, remains to be seen, and at least the portal-to-portal pay demands may be a major point of discussion before the new contracts are consummated.

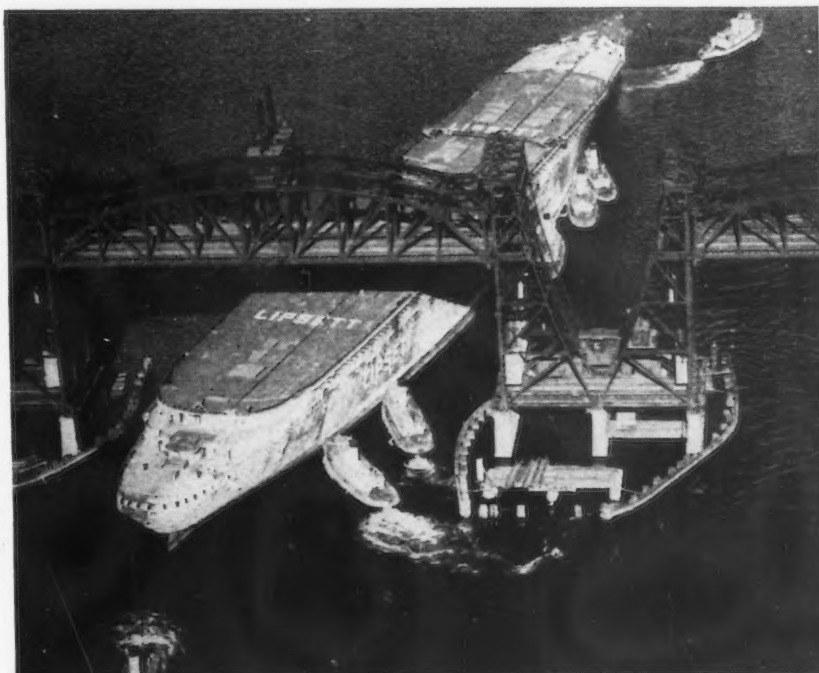
In the question of portal-to-portal (walking time) pay, nine plants in the Pittsburgh region have been earmarked by the USWA for wage demands for mill employees forced to enter plants prior to the actual starting time on their jobs. At the top union official meeting on Nov. 30, the

first move in the campaign to get this demand for their employees was mapped out. Members of the union will be advised of the union's claim for recovering back pay for travel time and job preparation activities on company property.

This question of portal-to-portal pay does not come as any surprise to industry, the CIO having clearly indicated its intentions several weeks ago to sound out and assist its membership in preparing claims for this compensation following the union's study of the June 10, 1946, decision of the U. S. Supreme Court in the case of *Anderson v. Mt. Clemens Pottery Co.*

Just how much travel and job preparation time will be involved in the union's action is difficult at present to determine. The firms listed by the USWA-CIO for this region that will be involved in the walking-time demands include: Jones & Laughlin Steel Corp., A. M. Byers Co., Monongahela Connecting Railroad Co., Dilworth-Porter Div. of Republic Steel Corp., Mackintosh-Hemphill

THE LAST MILE: The ex-luxury liner *Normandie* passes under a bridge in New York harbor on her way to a pier at Port Newark. There she will be cut up by Lipsett, Inc., who expect to get about 40,000 tons of scrap from her huge hulk.



Co., Edwin Bell Cooperage Co., Phillips Mine & Mill Supply Co., Oliver Iron & Steel Corp., and Troop Water Heater Co.

Some observers in the steel industry feel that the coming Congress will clarify many of the issues that are not exactly defined in existing laws. The case of portal-to-portal pay may be one of these points, since there are bills now being drawn up to exactly define a work day and to place a statute of limitations of retroactivity of union demands. One anticipated Bill places this statute of limitations at 1 yr and other at 2 yr.

Observers indicate that the Fair Labor Standards Act gives no thought as to what a work day consists of, and the liberal courts have added travel and job preparation time to the work day. This of course, follows the pattern set by the United Mine Workers' successful drive for portal-to-portal pay in the mines, where travel time is sometimes quite great. However, when Congress convenes in January, there is likely to be legislation that more clearly defines the rights and limitations of labor unions, and a major point will be the work day.

Also in a recent radio address, Sen. J. H. Ball, Republican of Minnesota, indicated that it was his intention to introduce legislation for the prohibition—or at least modification—of industry-wide bargaining, since this type of bargaining too often ties up the entire American economy in the case of a strike. A prime example of this, of course, is the current coal strike.

Canadian Iron and Steel Output Not Yet Affected by U. S. Coal Strike

Toronto

• • • The soft coal strike in the United States is not expected to have any serious effect on Canadian iron and steel production unless it is of long duration. During the period when Canadian steel workers were on strike, coal deliveries continued to be made to mills in this country with the result that they were able to build sizeable stockpiles. These stockpiles are said to be sufficient to take care of fuel requirements throughout most of the winter months.

On the other hand, however, curtailment in steel making operations in the States may result in reduced shipments of various steel materials and components to Canada, and conditions of this nature would be serious insofar as operations by Canadian plants depending on U. S. steels are concerned. Canadian steel producers are doing their utmost to provide materials for their own customers in the domestic market and it is not likely that they would step far out of line to assist consumers that have been buying regularly from American mills.

While the Steel Co. of Canada Ltd., Hamilton, is operating at virtual capacity insofar as its raw material supply for finishing mills is concerned, the company is still under somewhat of a handicap due to inability to obtain semi-finished steel from other Canadian produc-

ers. In normal times the Steel Company was a heavy buyer of steel from other Canadian mills, but during the strike period and since the conclusion of labor troubles among the basic producers, no steel has been available to the Hamilton mills from these outside sources. With the ordinary supply of outside steel not available, however, the finishing mills at the Steel Co. of Canada, are on production schedules somewhat below those of the first five months of this year. Blast furnaces and open hearths are close to the capacity rating.

Despite the fact that Canadian mills are booked almost solid on production to the end of next March, new orders and inquiries continue to appear. While some mills are accepting additional orders, they are making no definite promise of delivery, and others are out of the market insofar as first quarter commitments.

However, it is stated that steel makers will be opening books within the next few days for second quarter business, and it is stated that this will apply to practically all materials, including bars, steel sheets and plate. Nails, bolts and screws are in serious tight supply at this time and it is stated that backlogs on these materials are sufficient to absorb all production by Canadian mills into second and third quarter and it is doubtful that producers will catch up with demand before the end of next year.

With the general tightness in iron and steel supply in this country, some of the larger producers are supplying consumers on a quota basis and in this way are keeping most users supplied in part if not in full. No large accumulations of steel are reported in any of the consuming plants, with most operating on small tonnage spot deliveries.

Prospects are favorable for sustained demand for iron and steel over the coming year, with large tonnage orders pending from the shipbuilding industry across Canada, which is reported to have closed orders involving more than \$30 million. Railroad rolling stock builders also are showing keen interest in the market.

Coming Events

- Dec. 5-7 Electronic Microscope Society of America and American Society for X-ray & Electron Diffraction, joint meeting, Pittsburgh.
- Dec. 5-7 Electric Furnace Steel Committee of Iron & Steel Div., American Institute of Mining & Metallurgical Engineers, annual conference, Pittsburgh.
- Dec. 6-7 Northwest Mining Assn., annual meeting, Spokane, Wash.
- Dec. 9-11 Society for Experimental Stress Analysis, New York.
- Dec. 16-18 American Society of Refrigerating Engineers, annual meeting, New York.
- Jan. 6-8 Institute of Scrap Iron & Steel, Inc., convention, New York.
- Jan. 27-31 Electrical Engineering Exposition, New York.
- Jan. 27-31 International Heating and Ventilating Exposition, Cleveland.
- Jan. 28-Feb. 2 Society of Plastics Engineers, exhibition, Chicago.
- Mar. 17 American Institute of Mining & Metallurgical Engineers, world conference on mineral resources, New York.
- Mar. 17-19 American Society of Lubrication Engineers, annual meeting, Pittsburgh.
- Mar. 22 Western Metal Conference and Exposition, American Society for Metals, San Francisco.
- Apr. 29-May 1 Industrial Packaging and Materials Handling Exposition, Industrial Packaging Engineers Assn. of America, Chicago.

The London **ECONOMIST**

Politics and the Planners

WHETHER or not they find other points of agreement, the labor, management and government conferences in the two major industrial disputes now under way again—coal and automobiles—should promptly be able to settle on one conclusion: Something has happened that is not according to plan. They would be referring to the almost steady rise in prices and cost of living in which everybody seems always at a disadvantage.

The plan which has been implicit—and often explicit—among most vocal groups in this as well as other countries was that government should at least try to level off booms and depressions, inflations and deflations at a high level of prosperity and employment. The plan has been set forth in economic theory, political oratory, and even to a considerable degree in statute, for many years. This autumn and winter the plan is being tested in the United States, and even though the test is imperfect (as are all tests in political economy in the absence of the completely controlled conditions of the laboratory), the results are somewhat different from those for which the plan called.

The plan has been, perhaps, stated at its simplest by Mr. Stuart Chase, the very popular writer on economic subjects, in a study published 3 yr ago, entitled "Where's the Money Coming From?" "They (the managers of public finance) must be ready to spend, ready to tax, ready to stop spending and pay off the debt, as the count of unemployed varies," Mr. Chase declared. Prof. Alvin Hansen, another exponent, declared in his book, "Fiscal Policy and Business Cycles," in 1941. "After the national income had approached full employment levels, a sharply progressive tax structure would then draw in an amount of taxes sufficiently large to balance the budget, including both operating and capital expenditures."

In a series of economic studies

published last year by the Federal Reserve Board, Mr. E. D. Domar declared: "When inflation threatens, a budget surplus should be accumulated and a part of the debt repaid." In the same official volume, Mr. R. A. Musgrave stated, "As long as general inflationary pressures continue, high levels of taxation, retrenchment in public expenditures and, if possible, debt redemption will be required."

Mr. Kaldor, presumably with the blessing of Sir William Beveridge, contemplates in the appendix to "Full Employment in a Free Society," that in the transition period "surplus rather than deficit in . . . 'ordinary budget'" may be needed. Similar quotations could be added from the theorists all the way from Lord Keynes to the functional finance extremist, Mr. Abba Lerner, and from an equally wide range of public officials, labor leaders and not a few business men.

IN the United States now, and for many months, conditions are unmistakably those contemplated by the above remarks. Inflationary conditions clearly exist, the wholesale price level this week standing at 135 pct of the 1926 level, an advance of 21 pct since early June of this year. The count of unemployed reveals marked overemployment even by the strict Beveridge criterion. An apocryphal story now current illustrates the condition. The employment executive of a large corporation asks his opposite number in a competing concern about standards being used in physical examinations (which are usual before employment in all larger concerns). "We were startled to have an applicant this week," he replied. "We didn't take his temperature—we just felt him to see if he was warm!" Another is reported to have stated: "Sure, we got a few applicants these days, though none for anything less than vice-president. Sure, we take them."

In this situation the plan clearly

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• • •

calls for action to stop spending, to bring about a budget surplus, and for sizable debt redemption (from surplus revenues, not just from excess cash balances obtained from overborrowing a year ago, as has been occurring since March). But these things are not happening.

In his Budget Review in early August, President Truman referred to the mounting inflationary threat and asked officials to take drastic action to curtail expenditures, addressing specific letters to all top officials.

One of the definite objects was to reduce public works outlays from \$1600 million to \$700 million for the current fiscal year, ending next June 30. Six weeks later, under extreme political pressure, the Budget Bureau gave up the attempt. And so far as is known, no other reductions in expenditures have been made. Expenditures continue to be estimated at the high total of \$41,500 million for this fiscal year, and a deficit is in prospect of nearly \$2 billions, of which a sixth has been realized in the 4 months from July to October.

It is true that if the accounts of the government corporations and trust funds are lumped with the ordinary budget a cash surplus is shown, but this is a drop in the bucket in comparison with the rate at which the boom is proceeding. While monetary policy has been mildly restrictive, none could interpret it as being significantly so.

NOR is it clear that the Republicans would have acted differently. Prior to the elections (CONTINUED ON PAGE 129)

BLS Reports Earnings For Industrial Workers Up \$5 Weekly

Washington

••• Workers in the manufacturing industries on the whole were working 1 hr less but earning \$5 more weekly at the beginning of the last quarter of 1946 than a year ago, according to data collected by the Bureau of Labor Statistics. This is only about \$1.50 less than the weekly earnings peak during the war, the BLS declared.

Bureau estimates were based on reports received from 32,000 manufacturing establishments which employ approximately 7-121,000 production workers and cover both full and part-time workers.

Reports from 2600 mines employing more than 311,000 workers indicated that both earnings and hours had declined slightly. This, however, was attributed to shortages in railway cars as well as a short month, including a long holiday over Labor Day, in September.

In the manufacturing industries, earnings averaged \$45.83 for the average 40.5-hr week; those in the field of durables made

\$49.06, however, as compared with the \$42.48 for nondurable manufacturers.

In the mining industries, in September the bituminous coal miners averaged \$61 for a 41.4-hr week while anthracite miners received \$59.78 for a 37.7-hr week. Ore miners (iron, copper, lead and zinc) received \$49.50 for a 40.5-hr work week.

Workers in blast furnaces, rolling mills, steel plants and forging shops received the highest hourly wage, \$1.31, as compared with \$1.21 for the industry as a whole. The average weekly pay in the industry was \$49.31 for a 39.7-hr week.

Wage increases and premium overtime work combined to raise the weekly September earnings in 17 of 20 major manufacturing groups. Automobile, transportation equipment and food processing groups were the only major classifications to show a decline.

In the field of iron, steel and their products, earnings showed a slight increase and hours a small decline except in the gray iron and semisteel casting and steam

and hot water apparatus groups. While earnings increased in the nonferrous metals groups, the work week also showed a slight lengthening in most of the classifications.

W. C. Foster Assumes Commerce Dept. Post

Washington

••• The White House has announced the appointment of William Chapman Foster, Long Island City business man, as Under Secretary of Commerce to succeed Alfred Schindler, who is resigning to return to private business.

Mr. Foster is president of the Pressed & Welded Steel Products Co., as well as secretary and director of another Long Island City firm, the Wagner Machinery Corp. He is no stranger at the Commerce Dept., at present being a member of that agency's Small Business Advisory Committee.

Mr. Schindler has held the post of Under Secretary since April 1945, at which time he was appointed by President Roosevelt at the request of Secretary Henry Wallace; he has been reported as anxious to leave the job since Mr. Wallace was succeeded by W. Averell Harriman.

Metal Powder Group Elects

New York

••• At the recent annual business meeting of the Metal Powder Assn. held in Atlantic City, N. J., concurrently with the National Metals Congress, H. E. Hall, president of the Metals Disintegrating Co., Elizabeth, N. J., was reelected president of the association. Other officers elected were S. K. Wellman, president of the S. K. Wellman Co., Cleveland, vice president; F. E. Wormser, New York, acting secretary and treasurer; P. E. Weingart, of the American Metal Co., Ltd., New York, chairman of the board of directors.

V. T. Price, secretary of the Pyron Corp., Niagara Falls, N. Y., was elected to the Board for a 3-yr term. Other directors are: B. T. duPont, Plastic Metals Division, National Radiator Co., Johnstown, Pa.; T. L. Robinson, S. K. Wellman Co., Cleveland; W. M. Weil, National Smelting Co., Cleveland.

HOURS AND EARNINGS IN MANUFACTURING INDUSTRIES

(As of Oct. 1, 1946)

(Industry Average)	Weekly Wage	Weekly Hours	Hourly Rate
Iron, Steel and their Products.....	\$49.31	39.7	\$1.216
(Blast furnace, rolling, mills, steel works).....	(50.28)	(38.0)	(1.314)
(Gray iron, semisteel castings).....	(52.58)	(42.3)	(1.203)
(Malleable iron castings).....	(51.50)	(40.7)	(1.222)
(Steel castings).....	(49.28)	(38.3)	(1.263)
(Cast iron pipe and fittings).....	(43.59)	(40.8)	(1.035)
(Wirework).....	(50.30)	(41.4)	(1.183)
(Iron and steel forgings).....	(53.52)	(39.5)	(1.314)
Electrical Machinery.....	48.45	40.8	1.153
Other Machinery.....	51.79	41.1	1.232
(Machinery-machine shop products).....	(51.08)	(41.2)	(1.212)
(Agricultural, except tractors).....	(51.09)	(40.4)	(1.215)
(Machine tools).....	(54.31)	(42.0)	(1.269)
(Machine tool accessories).....	(56.28)	(41.5)	(1.305)
Automobiles.....	53.12	38.7	1.354
Other Transportation Equipment.....	52.81	39.0	1.366
Nonferrous Metals and their products.....	48.68	40.7	1.166
(Primary refining and smelting).....	(48.74)	(40.3)	(1.189)
(Alloying, rolling, drawing).....	(51.50)	(40.5)	(1.252)
(Aluminum manufactures).....	(47.10)	(39.6)	(1.176)
All Manufacturing Groups.....	45.83	40.5	1.132
Durable Goods.....	49.06	40.7	1.205
Nondurable Goods.....	42.48	40.3	1.055
(Lumber and timber).....	(38.79)	(41.4)	(0.910)
(Stone, clay, glass products).....	(44.15)	(40.6)	(1.057)
(Textile and fiber products).....	(37.53)	(40.0)	(0.877)
(Food processing).....	(43.56)	(43.0)	(0.986)
(Coal mining, hard and soft).....	(58.89)	(38.5)	(1.509)
(Ore mining, iron, copper, lead).....	(49.50)	(40.5)	(1.205)
(Crude oil production).....	(53.43)	(40.9)	(1.311)

The above table is compiled by THE IRON AGE from reports by the Bureau of Labor Statistics. Parenthetical data comprise breakdowns of major classifications within the preceding category. Figures relate to production workers only and do not include administrative and clerical employees, more generally referred to as "white collar" workers.

Kaiser's Iron Chief Iron Mine Rights Jeopardized by Litigation

Los Angeles

• • • Transfer of clear title to the Iron Chief ore property in Riverside County, Calif., said to be the largest known and proved accessible body of undeveloped high grade iron ore on the continent, is clouded by litigation now pending in Los Angeles superior courts. Iron Chief mining rights were purportedly sold on Apr. 16, 1946 to Kaiser Co., Inc. by E. T. Foley for \$1,132,811.35.

Harlan H. Bradt, Los Angeles mining man who acquired a contract to lease and purchase Iron Chief for \$1,500,000 Apr. 24, 1940 from the Southern Pacific Land Co., filed suit Dec. 2 against Mr. Foley, Pasadena contractor and former associate, to get one-fourth undivided interest in the property or collect \$2,332,430 which he claims to be a fair one-quarter share of the true worth of the properties and to which he is entitled in the joint venture with Foley.

Kaiser Co., Inc. purchased from Southern Pacific the underlying fee of the Iron Chief subject to the Bradt and Foley lease in February 1944.

Mr. Bradt's answer and cross complaint counters the suit filed by Foley on Oct. 25, 1946 against Bradt for a declaratory judgment designed to validate Foley's purported sale to the Kaiser Co. and to force Bradt, president and sole stock owner in the Riverside Iron and Steel Corp., a Nevada corporation, to accept and abide by that transaction. Mr. Foley had claimed in his complaint that he negotiated with Kaiser Co. and subsequently sold the leasehold on Iron Chief to that organization but that Bradt and the Riverside Iron and Steel Corp. refused to recognize and be bound by the transaction.

It had been Foley's contention that the \$1,132,811.35 was a fair price and Bradt disputes this point. Mr. Foley seeks to declare the rights and obligations of the parties and obtain an adjudication of the disposition of the money paid by the Kaiser Co.

Bradt states in his answer to Foley's suit:

"These defendants allege that

plaintiff had no authority to make said purported sale and particularly did not have any authority to make said purported sale as to the interests of defendants Riverside and Bradt and that said purported sale was not a valid sale."

Among the allegations made in Bradt's cross complaint against Foley, he states:

"That cross-defendant Foley did not advise cross-complainants Riverside or Bradt, or either of them, of the pending purported assignment to Kaiser, and cross-defendant Foley failed and neglected to inform Riverside or Bradt of this purported assignment until after the escrow in connection with the purported assignment had been closed and terminated.

"That throughout the negotia-

tions between Foley and Kaiser for the purported assignment of the lease and sales agreement in connection with the Iron Chief, Kaiser had knowledge and notice of the interest of Riverside and Bradt in the lease and sale agreement and in the Iron Chief."

Other allegations by Bradt include neglect on the part of Foley in failing to perform leasee's obligations and that he had failed to commence any work of prospecting or mining the leased premises.

Bradt states that the value of the lease and sales agreement on Apr. 16, 1946 was \$9,329,720 and that Riverside and himself by reason of the acts of Foley, have sustained damage in the sum of \$2,332,430.

When informed of the pending litigation A. B. Ordway, vice president of Kaiser Co., Inc., stated that since the Kaiser Co. "apparently was not involved in the present lawsuits" they will in no way delay any development work.

Coal Strike Expected to End Rated Orders for Steel and Pig Iron

Washington

• • • Due to the coal strike practically all rated orders for iron and steel products and merchant pig iron are expected to be thrown out the window by CPA this week. After a long and bitter struggle with housing expediter Wilson W. Wyatt, CPA compromised and on Dec. 2 had prepared orders calling for delivery of only 25 pct of mill production on rated orders after Dec. 31, and a reduction in certified merchant pig iron orders corresponding to the anticipated drop in production.

This action may mean that the iron and steel industry will be permanently free from rated orders, in view of the expiration of CPA on Mar. 31. When this agency cancelled ratings in January of this year it was not able to return to a priorities system until September.

The orders prepared by CPA called for the following steps:

Iron and Steel Products

1. Beginning with the effective date of the order, preference ratings will not be issued for items of iron and steel during the period

of the coal strike, except for emergency needs deemed essential to public health and safety.

2. No producer of iron and steel will be required to schedule more than 25 pct of his total anticipated monthly production of any product classification for delivery after Dec. 31 to fill rated orders. AAA orders and specific emergency directives issued after the date of cancellation will not be affected.

3. Warehouses will not be required to accept any rated order for any one product classification of steel in excess of 10,000 lb if delivery of the order would deplete warehouse stocks to a point where the warehouse function in the distribution of steel would be seriously impaired.

Merchant Pig Iron

1. Authorizations and placed certified orders will not be issued under Directive 13 to M-21 during the emergency period.

2. Merchant pig iron producers will be required to reduce the amount of pig iron delivered under the certification plan by the percentage which anticipated production will drop.

Industrial Briefs...

• **ACQUIRES OWNERSHIP**—George T. Koch, consulting engineer and president of Engineering Service, Inc., Detroit, has recently acquired sole ownership of the firm. E. B. Throop, member of the Institute of Internal Auditors has been elected secretary-treasurer.

• **UNIT-AREA SYSTEM**—An integrated unit-area system for industrial plants which simplifies the use, installation and maintenance of air-conditioning and other equipment in "controlled conditions" factories is being introduced by The Austin Co.

• **NEW RESEARCH BUILDING**—American Can Co. has opened a new research building at Maywood, Ill., and recently celebrated the 40th anniversary of the founding of its research division. From a two-man chemical laboratory at Niagara Falls, N. Y., in 1906, the first in the can manufacturing industry, the company's research has steadily expanded.

• **APPROVE SALE**—Stockholders of American Central Mfg. Co., Connersville, Ind., have approved the acquisition of that company by Aviation Corp.

• **NEW RESEARCH LAB**—Brooks Oil Co. completed construction of a \$35,000 laboratory at the company's Cleveland plant, to increase facilities for research and for routine testing of Brooks "Leadolene" industrial lubricants.

• **PIANO PLANT CHANGE**—The Edison General Electric Appliance Co. has bought the former Baldwin Piano Co. plant at Chicago Heights, Ill. The building contains 200,000 sq ft of floor space and is located on a 6½ acre site which Edison will convert to produce restaurant cooking and baking equipment.

• **NEW ALUMINUM TILE**—An aluminum tile, known as "Altico Tile" is now available to home builders. Measuring 4¼ x 4¼ in., the tile comes in 14 colors in addition to the conventional black and white. While its primary use is for bathrooms and kitchens, the manufacturer, Onondaga Floor, Inc., Syracuse, N. Y., claims that it is ideal for outdoor applications.

• **STEEL WAREHOUSE**—A new tool steel warehouse to serve southwest Ohio and Kentucky will be opened Dec. 6 in Dayton, by the Allegheny Ludlum Steel Corp.

• **NEW PUMPS**—Pedrifugal pumps, designed for use with Texrope V-belt drives, which give an infinite range of capacities regulated by size of sheaves and power supplied, has been announced by the Allis-Chalmers Mfg. Co., Milwaukee. The new line of cast iron, bronze fitted, pedestal-type centrifugal pumps come in three principal sizes: 1 x 1 in., 2 x 2 in., and 3 x 3 in. Capacities are from 10 to 500 gal per min at heads of from 10 to 100 ft, with power requirements from ¼ to 15 hp.

• **WAA APPROVAL**—Approval of sale to Pacific Tube Co. of the government-owned facilities operated by that company during the past 3½ yr was announced by the WAA.

• **TOOL-DIE EXPANDS**—The Tool-Die Engineering Co., Cleveland, is now setting up a plant at E 93rd and Loren Ave. to manufacture die castings—zinc and aluminum—as well as permanent mould castings.

• **BUILDERS HARDWARE**—Chartered in New York State and organized to manufacture a newly designed line of builders' hardware, Duncan Shaw Corp. has opened an office at 33 W 42nd St., New York. Duncan Shaw is president.

Merchant Furnace Ups Pig Iron Prices \$2.00

Pittsburgh

• • • Pittsburgh Coke & Chemical Co. announced, effective Dec. 1, an increase of \$2.00 a gross ton on its four grades of merchant pig iron; basic, No. 2 foundry, malleable, and bessemer. The new prices, Neville Island, become: Basic—\$30.00; No. 2 Foundry, \$30.50; Malleable, \$30.50; and Bessemer, \$31.00.

Rise in Manufacturers' Inventories Reported

Washington

• • • Continuing an unbroken rise that started with the first of the year, the total manufacturers' inventories at the end of October were \$19.5 million, an increase of more than \$600 over the preceding 9 months' total, according to the Office of Business Economics, Dept. of Commerce.

October preliminary data also indicate a very large increase in the dollar value of manufacturers' shipments, OBE said. Deliveries for the month were over \$12.5 billion, the highest peacetime figure achieved. October was an unusually long working month. Nevertheless, the rate of shipments adjusted for working days rose to 250 (1930 = 100) as compared with 242 in September.

Society of Engineers Organize New Chapter

Worcester, Mass.

• • • A Worcester chapter of the Massachusetts Society of Professional Engineers has been organized with Max H. Kuhner, chief mechanical engineer of Riley Stoker Corp. as chairman. Other members of the instigating committee are:

Ollison Craig, engineering manager; Gustaf A. Rehm and Charles F. Hawley, assistant mechanical engineers; and Herbert F. Johnson, mechanical engineer, all of Riley Stoker Corp.; Milton F. Beecher, director of research, Norton Co.; and Carl L. Benson, chief engineer, Eastern Refractories Co.

Construction Steel...

New York

• • • Fabricated steel awards this week included the following:

- 5500 Tons, Kansas City, Mo., building for the Loose Wiles Biscuit Co. to Allied Construction Co.
- 600 Tons, Big Creek, Calif., Southern California Edison Co. penstock, to Consolidated Steel Corp., Los Angeles.
- 460 Tons, Huntington Park, Calif., Lafayette exchange building addition, Southern California Telephone Co., to Bethlehem Pacific Coast Steel Corp., San Francisco.

- 180 Tons, States of Illinois, New Mexico, bridge repairs on the Atchison, Topeka & Santa Fe R.R., to American Bridge Co., Pittsburgh.

- 145 Tons, Grand Coulee, Wash., gantry crane for Grand Coulee Pumping Plant, Bureau of Reclamation, Spec. 1931, to Star Iron & Steel Co., Tacoma, Wash.

- 105 Tons, San Francisco, cranes for Naval Shipyard, Hunters Point, to Judson Pacific-Murphy Corp., San Francisco.

• • • Fabricated steel inquiries this week included the following:

- 1800 Tons, Wilmington, Calif., units 3, 4 and 5, Harbor Steam Plants, Spec. 9642, Dept. of Water & Power, Los Angeles, bids to Dec. 4.

- 550 Tons, Terre Haute, Ind., extension to Drasser Power Station.

- 450 Tons, Chicago, factory building for Lundstrom & Stubbs Inc.

- 405 Tons, Wilmington, Calif., addition to Union Oil Co. plant, Fluor Corp., general contractor.

- 335 Tons, Bloomfield, N. M., beam bridge, State of New Mexico.

- 315 Tons, Santa Fe, N. M., highway bridge for State of New Mexico.

• • • Reinforcing bar awards this week included the following:

- 1600 Tons, East Peoria, Ill., engine plant Caterpillar Tractor Co. to S. M. Nielsen Co. Steel not yet purchased.

• • • Reinforcing bar inquiries this week included the following:

- 220 Tons, Los Angeles, overcrossing on Hollywood Parkway at Grand Ave., Oberg Bros., general contractor, low.

- 200 Tons, Tucumcari, N. M., miscellaneous bars, Bureau of Reclamation, Denver, Spec. 1531, bids to Dec. 17.

• • • Plate awards this week included the following:

- 4775 Tons, Grand Coulee, Wash., discharge pipes for Grand Coulee Pumping Plant, Bureau of Reclamation, Denver, Spec. 1338, to Western Pipe & Steel Co., San Francisco.

• • • Sheet piling inquiries this week included the following:

- 1065 Tons, Milwaukee, dock for Blatz Brewing Co. dockhouse.

rather than less, vulnerable to depression. It strains the relations between management and workers and makes more difficult the attainment of labor peace.

The emergence of these facts from the crucible of reality places a great responsibility upon the planners. Political pressures have made it impossible to test their basic hypothesis this time. How can it be recast to accord with reality, and so avoid producing even more harmful results in the future? Granted that the government must accept greater responsibility for social welfare and cannot simply withdraw to *laissez faire*, how can these new social responsibilities be reconciled with the restrictive techniques that are desirable during a boom?

Perhaps one basic flaw in the theory is the conviction of most of its holders that the great peril of this country is stagnation. This premise, which seems invalid at least for the present, has led to far greater emphasis upon convincing the politicians of the desirability of all but endless expenditure in normal times than upon making clear to them that under some conditions large expenditure could be harmful.

This misplaced emphasis arose not only from the fear of stagnation, but also from the desire to overcome the psychological obstacles to sizable expenditures which are so strong in this country. Perhaps the planners, too, did not realize how much more persuasive to the politicians' ears the plea for expenditure would be than the necessity for restriction on some occasions. Or, perhaps, more simply and bluntly, the planners have never understood the realities of politics.

Decontrol Tinplate Scrap

Washington

• • • All controls on the delivery of tinplate scrap, including used tin cans, have been removed by CPA, effective Nov. 26.

The recovery of tin from scrap has dropped to negligible amounts according to Erwin Vogelsang, chief of CPA's Tin-Lead-Zinc Branch. He attributed the decline and secondary recoveries to the recent shutdown of a DPC detinning plant, plus the decline in salvage activities which had been conducted by many Army camps.

London Economist

(CONTINUED FROM PAGE 125)

their chief spokesman was Representative Knutson, who, in a Republican Congress, will now become Chairman of the important House Ways and Means Committee. He has pledged himself to offer a Bill for a 20 pct reduction in individual income taxes and for cuts in excise taxes as well.

The logical void created by his failure to elaborate a similar method of reducing the offsetting level of expenditure was partially filled by a postelection statement of Senator Taft, who is in line for the Senate Majority leadership and Chairmanship of the Finance Committee. He believes it possible to cut expenditures to \$30 billion level in the fiscal year beginning July 1, 1947, and to \$25 billion within 2 yr.

If the Republicans implement the Legislative Reorganization Act of last August, they should have a better chance of achieving budget balance than heretofore since the new bill requires that the four Congressional committees concerned with revenue and expenditure should meet together at the beginning of each session to recommend a federal budget for

the coming year. But the Republican calendar puts tax cuts first.

As the plan actually works in this period of test therefore, the government is not, in boom and inflation, pursuing a noticeably substantial countercyclical or anti-inflationary policy. It is in fact continuing action which stimulates the boom and the inflation. If its acts are not so markedly stimulating as the plan would call for in underemployment and deflation, they certainly are not restrictive.

What is actually happening is the clumsy taxation of inflation, which is rather blindly redistributing income and wealth. Those with fixed incomes and fixed obligations are losers, those with the strongest bargaining power and the greatest speculative agility hold their position, or are, frequently, gainers. This result has little similarity to the social ideals of those who have done the planning—or indeed to any ideals of any kind.

Not only are social ideals betrayed by this result, but the objectives of economic stability are being impaired. This development aggravates the instability that was carried over from the war, and makes the economy more,

MACHINE TOOLS

... News and Market Activities

Higher Parts Prices Worry Industry

••• While the coal dilemma has had no direct effect on the machine tool industry as yet, the problem of price increases continues to provide many segments of the industry with food for thought, according to qualified observers.

Prefacing the price problem is the postwar priority question of whether customers will be willing to buy new machine tools at increased prices which make the government-owned surplus more attractive by the simple device of widening the price differential. At the same time, castings, controls and other components are being increased in price, making the matter one of unhappy choice in many cases. It is not surprising that the feeling that machine tool prices should have been increased substantially when OPA authorized the 20 pct boost is growing in some segments of the industry.

Although WAA sales volume is up in Detroit in response to the substantial reduction in machine tool prices, standard tools are lagging badly and except in the welding field, orders for specialized tooling equipment have also slowed down noticeably during the past 3 months.

The automobile industry has indicated definitely that it is out to economize in every way possible and the move made this past week by General Motors to hold up all die work on the 1948 Chevrolet "A" body is indicative of this trend. It is expected that a considerable volume of die work will be lost temporarily at least by this GM decision. Up to the present time, the corporation has offered no official explanation for the action taken.

Even though surplus equipment is moving at a brisk pace, hardly more than a dent has been made in the huge supply held in Detroit warehouses. During the past week a Morton grinder originally costing \$8000 was sold for \$900 in the unused condition and similar deals are said to be fairly commonplace. At the same time the most desirable equipment is reported to be very

well picked over, highly desirable items like radial drills, certain types of grinders and Universal milling machines are said to be almost unobtainable.

There is some indication that under today's extremely favorable prices, machine tool dealers as well as certain producers are buying equipment from surplus which will definitely be stored until a more favorable market appears or the item can be used to replace machines still in service. It is expected that the net effect of this forward buying psychology, if it reaches large proportions, will be to liquidate the WAA surplus much sooner than would otherwise be expected.

News that the Army and Navy are to build up a large reserve of special machine tools for use in a national emergency was received with considerable enthusiasm here, especially by those who see in this move an opportunity to liquidate a large amount of the present surplus or at least move this equipment into a noncompetitive category. While many specialized machine tools adaptable to ordnance work have already been scrapped, it is expected that large numbers of certain types of equipment are still available and that steps will be taken soon to transfer these items to Army and Navy reserves. While RFC owns a large share of this equipment and congressional action will be required to pry it loose, it is confidentially expected that such action will be taken without prolonged haggling in Washington.

Builders of specialized equipment continue to receive a substantial number of inquiries, but the number of actual long-range tooling commitments is not nearly as large as it was several months ago. This has given some builders reason to anticipate a considerably smaller volume a few months hence. GM and Kaiser-Frazer have recently placed orders for new tooling, but the volume of new business anticipated for early 1947 appears definitely to be less than forecasts made several months ago.

It is not difficult to find an explanation for the reduced volume of machine tool business in Detroit as well as the hesitation by manufacturers to make firm commitments. It has been estimated, for example, that 1948 model tooling cost will be 50 to 60 pct above quotations furnished shortly after VJ-Day. Compared with prewar prices, tooling costs are said to be up somewhere around 150 pct. Remembering also that automobile manufacturers do not have to change models as long as they can move present cars and with the present high cost of cars, the weakening of the Detroit market for machine tools can be readily explained.

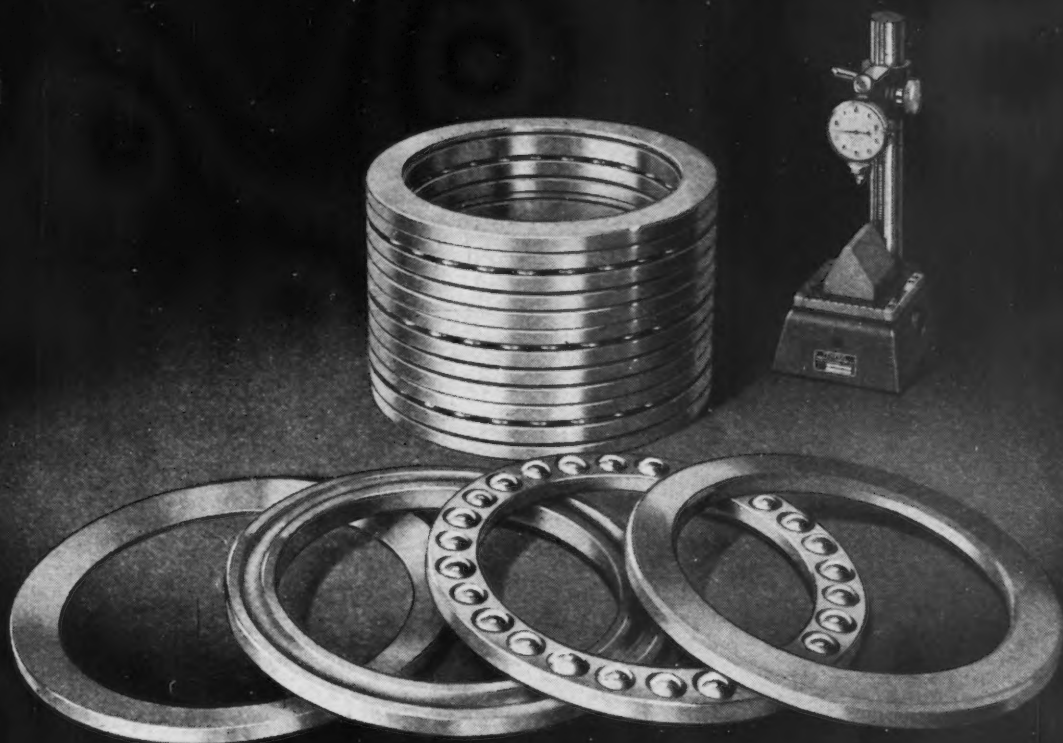
In Cincinnati the price situation is practically unchanged, and production is being maintained at full capacity. Although the supply of material is not as plentiful as could be desired, no important disjuncture of production has been reported. Coal reserves in this area have been somewhat better than average and thus far the freight movement has not been affected and shipments are going out on schedule.

In Boston some companies report that '46 will prove a better year than '45, and that current ordering is above October levels. The government-owned surplus is still a wet blanket, however, despite reports that WAA is meeting buyer resistance. Further price reduction in surplus tools is expected next month by some sources.

Some machine tool builders in the East are displaying more interest in foreign markets than at any time since the war, and in addition to returning resident representatives to Europe and elsewhere, special representatives are going abroad to aid metalworking plants to lay out production programs and demonstrate the latest models of U. S. machine tools. France and Belgium are perhaps canvassed more than other European countries, but most countries are to be covered, including Holland, Sweden, Switzerland and England.

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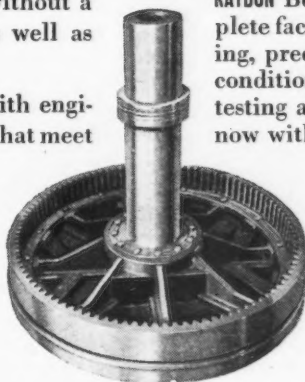
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the requirements of machinery to step up output. Counsel in confidence with KAYDON. Capacity is available now for production of all types and sizes of KAYDON Bearings. In addition, KAYDON also offers complete facilities for atmospheric-controlled heat treating, precision heat treating, salt-bath and sub-zero conditioning and treatment, microscopy, physical testing and metallurgical laboratory services. Plan now with KAYDON.

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Spherical Roller • Taper Roller
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NONFERROUS METALS

... News and Market Activities

Committee Increases Tin Allocated to U. S.

Washington

• • • The allocation of tin to the United States for the last half of 1946 has been raised from 6400 to 7280 long tons, the Combined Tin Committee announced on Dec. 3.

This was made known as the committee announced its recommendation to the member governments for the final allocations of tin for 22 countries, the Middle East and Latin America for the second half of this year. The amounts recommended include the countries already allocated on an interim basis for the period, and do not include domestic smelter production. Allocations are recommended on the basis of replies to periodic questionnaires sent out by the committee. A questionnaire covering the first half of 1947 was prepared recently. In general, the committee said, supplies of tin may be obtained from the following sources: Belgium, British or Dutch, South Africa and Japanese stocks in the United States. For Latin American countries, the United States is an additional source for limited quantities, and supplies will also be available to France from French Indo-China and to the United States from China.

China was formally represented on the committee for the first time and the membership of the committee now consists of representatives of Belgium, China, France, the Netherlands, United Kingdom and the United States.

The final allocation in long tons follows:

Austria, 225; Argentina, 200; Brazil, 225; Ceylon, 40; Chile, 25; Canada, 1365; Czechoslovakia, 680; Denmark, 275; Egypt, 200;

Finland, 135; France, 4550; Greece, 90; India, 2275; Italy, 910; Iran, 25; Latin American countries (not elsewhere specified) 165; Middle East, 150; Mexico, 25; Norway, 135; Poland, 410; Switzerland, 730; Sweden, 775; USA, 7280; Yugoslavia, 180.

CPA Decontrols Some U. S. Copper Scrap

Washington

• • • CPA announced on Dec. 2 that it had relaxed its control over sales by Army, Navy and Maritime Commission of certain types of copper and base alloy scrap and listed the types of scrap for the sales of which CPA authorization is still required. The following types of scrap for which CPA will continue to authorize sales by the three government departments are cartridge brass ingots, slabs, discs, bars, partly or completely manufactured ammunition cases (new or demilitarized), fired cases or remelt ingot, gilding metal mill forms or remilled ingots. The change was made by an amendment to Direction 22 to PR-13, while at the same time, CPA revoked Direction 19 to the same regulation which channelled sales of all copper and copper base alloy scrap by WAA to smelters and reprocessors.

Kaiser Buys Tacoma Aluminum Ingot Plant

Washington

• • • Sale of a government owned aluminum reduction plant in Tacoma, Wash., to the Permanente Metals Corp., Oakland, Calif., for \$3 million has been approved by WAA. The government agency

Monthly Average Prices

• • • The average prices of the major nonferrous metals in November, based on quotations appearing in THE IRON AGE, were as follows:

	Cents Per Pound
Electrolytic copper, Conn. Valley	17.188
Lake copper, Conn. Valley	17.226
Straits tin, New York	64.00
Zinc, East St. Louis..	10.423
Zinc, New York	10.863
Lead, St. Louis	10.258
Lead, New York	10.408

said the purchaser plans to produce aluminum for civilian use and estimates employment will be provided for 400 persons. The new owner, it was stated, estimates that an additional \$1 million will have to be expended to place the plant in operation. It was operated by Olin Industries, Inc., during the war. The plant has a rated capacity of 41.5 million lb of aluminum ingots annually and its current fair value was fixed at \$3,189,748.

In approving the sale, WAA pointed out that there are eight other government owned aluminum reduction plants, five of which cannot be placed in private operation at present because electric power is not available at reasonable rates. Of the remaining three plants, two have been leased to Reynolds Metals and one (Spokane, Wash.) to Permanente Metals.

Antimony Controls Off

Washington

• • • All restrictions on imports of antimony have been removed by CPA, effective Nov. 29. At the same time, CPA directed the RFC to discontinue public purchase of antimony from foreign sources except for commitments and arrangements already undertaken.

Antimony was originally placed under import control in Dec. 1941, and was removed in Nov. 1944. The difference between the world price of the ores and domestic ceilings required that it be returned to M-63 controls in Oct. of this year.

Nonferrous Metals Prices

Cents per pound

	Nov. 27	Nov. 28	Nov. 29	Nov. 30	Dec. 2	Dec. 3
Copper, electro, Conn.	19.50	19.50	19.50	19.50	19.50	19.50
Copper, Lake, Conn.	19.625	19.625	19.625	19.625	19.625	19.625
Tin, Straits, New York	70.00	70.00	70.00	....	70.00	70.00
Zinc, East St. Louis	10.50	10.50	10.50	10.50	10.50	10.50
Lead, St. Louis	11.65	11.65	11.65	11.65	11.65	11.65

NONFERROUS METALS PRICES

Primary Metals

(Cents per lb, unless otherwise noted)

Aluminum, 99+%, f.o.b. shipping point (min. 10,000 lb).....	15.00
Aluminum pig, f.o.b. shipping point.....	14.00
Antimony, American, Laredo, Tex.	23.50
Beryllium copper, 3.75-4.25% Be; dollars per lb contained Be.....	\$14.75
Beryllium aluminum, 5% Be; dollars per lb contained Be.....	\$30.00
Cadmium, del'd (per lb).....	\$1.50
Cobalt, 97-99% (per lb).....	\$1.50 to \$1.57
Copper, electro, Conn. Valley.....	19.50
Copper, lake, Conn. Valley.....	19.625
Gold, U. S. Treas., dollars per oz.....	\$35.00
Indium, 99.8%, dollars per troy oz.....	\$22.25
Iridium, dollars per troy oz.....	\$125.00
Lead, St. Louis.....	11.65
Lead, New York.....	11.80
Magnesium, 99.8+ %.....	20.50
Magnesium, sticks, carlots.....	36.00
Mercury, dollars per 76-lb flask, f.o.b. New York.....	\$89 to \$90
Nickel, electro, f.o.b. refinery.....	\$24.00
Palladium, dollars per troy oz.....	\$240.00
Platinum, dollars per troy oz.....	\$69 to \$72
Silver, New York, cents per oz.....	90.125
Tin, Straits, New York.....	70.00
Zinc, East St. Louis.....	10.50
Zinc, New York.....	10.94
Zirconium copper, 6 pct Zr, per lb contained Zr.....	\$ 6.00

Remelted Metals

Brass Ingot

(Cents per lb, in carloads)

85-5-5-5 ingot	
No. 115.....	20.50
No. 120.....	20.00
No. 123.....	19.50
80-10-10 ingot	
No. 305.....	23.50
No. 315.....	22.00
88-10-2 ingot	
No. 210.....	25.75
No. 215.....	24.75
No. 245.....	21.75
Yellow ingot	
No. 405.....	16.25
Manganese Bronze	
No. 421.....	18.25

Aluminum Ingot

(Cents per lb, lots of 30,000 lb)

95-5 alum.-sil. alloys:	
0.30 copper, max.....	17.00
0.60 copper, max.....	16.75
Piston alloys (No. 122 type).....	15.50-15.75
No. 12 alum. (No. 2 grade).....	15.50
108 alloy.....	15.50-16.00
195 alloy.....	16.25
AXS-679.....	15.75-16.00
Steel deoxidizing aluminum, notch-bar, granulated or shot.....	
Grade 1-95 pct-97½ pct.....	16.25
Grade 2-92 pct-95 pct.....	15.75
Grade 3-90 pct-92 pct.....	15.50
Grade 4-85 pct-90 pct.....	15.00

Electroplating Supplies

Anodes

(Cents per lb, f.o.b. shipping point in 500 lb lots)

Copper, frt. allowed	
Cast, oval, 15 in. or longer.....	36½
Electrodeposited.....	30½
Rolled, oval, straight delivered.....	31½
Curved, 18 in. or longer, delivered.....	31½
Brass, 80-20, frt. allowed	
Cast, oval, 15 in. or longer.....	33½
Zinc, Cast, 99.99.....	18½
Nickel, 99 pct plus, frt. allowed	
Cast.....	51
Rolled, depolarized.....	52
Silver, 999 fine	
Rolled, 1000 oz lots, per oz.....	93½

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 1-5 bbl.....	
Copper sulphate, 99.5, crystals, bbls.....	14.50
Nickel salts, single, 425 lb bbls, frt. allowed.....	0.749
Silver cyanide, 100 oz lots, per oz.....	15.00
Sodium cyanide, 96 pct, domestic, 125 lb drums.....	33.00
Zinc cyanide, 100 lb drums.....	
Zinc, sulphate, 89 pct, crystals, bbls, frt. allowed.....	.0635

Mill Products

Aluminum

(Cents per lb, base, subject to extras for quantity, gage, size, temper and finish)

Drawn tubing: 2 to 3 in. OD by 0.065 in. wall: 3S, 43.5¢; 52S-O, 67¢; 24S-T, 71¢; base, 30,000 lb.

Plate: ¼ in. and heavier: 2S, 3S, 21.2¢; 52S, 24.2¢; 61S, 23.8¢; 24S, 24S-AL, 24.2¢; 75S, 75S-AL, 30.5¢; base, 30,000 lb.

Flat Sheet: 0.136-in. thickness: 2S, 3S, 23.7¢; 52S, 27.2¢; 61S, 24.7¢; 24S-O, 24S-OAL, 26.7¢; 75S-O, 75S-OAL, 32.7¢; base, 30,000 lb.

Extruded Solid Shapes: factor determined by dividing the perimeter of the shape by its weight per foot. For factor 1 through 4, 3S, 26¢; 14S, 32.5¢; 24S, 35¢; 53S, 61S, 28¢; 63S, 27¢; 75S, 45.5¢; base, 30,000 lb.

Wire, Rod and Bar: screw machine stock, rounds, 17S-T, ¼ in., 29.5¢; ½ in., 37.5¢; 1 in., 26¢; 2 in., 24.5¢; hexagons, ¼ in., 35.5¢; ½ in., 30¢; 1 in., 2 in., 27¢; base, 5000 lb. Rod: 2S, 3S, 1¼ to 2½ in. diam, rolled, 23¢; cold-finished, 23.5¢; base, 30,000 lb. Round Wire: drawn, cold, B & S gage 17-18: 2S, 3S, 33.5¢; 56S, 39.5¢; 10,000 lb base: B & S gage 00-1: 2S, 3S, 21¢; 56S, 30.5¢. B & S 15-16: 2S, 3S, 32.5¢; 56S, 38¢; base, 30,000 lb.

Magnesium

(Cents per lb, f.o.b. mill)

Sheet and Plate: Ma, FSA, ¼ in., 54¢; 56¢; 0.188 in., 56¢-58¢; B & S gage 8, 58¢-60¢; 10, 59¢-61¢; 14, 69¢-74¢; 16, 79¢-81¢; 18, 87¢-89¢; 22, \$1.25-\$1.31; 24, \$1.71-\$1.75. Base quantity, 30,000 lb.

Round Rod: M, diam in. ¼, 55¢; ½, 47¢; ¾, 46¢; 1, 45¢; 1½, 44¢; 2, 43.5¢; 2½, 42.5¢; 3, 41.5¢; 4, 42.5¢; 5, 43.5¢; 6 & 7 in., 44¢. Base price, 5000-10,000 lb.

Square and Hexagonal Bar: M, diam in. ¼, 58¢; ½, 50¢; ¾, 48¢; 1, 47.5¢; 1½, 46.5¢; 2, 44.5¢; 3, 43.5¢; 4 & 5 in., 44.5¢; 6 & 7 in., 45¢. Base quantity, 5000-10,000 lb.

Tubing: Varies with wall thickness and outside diameter.

Nickel and Monel

(Cents per lb, f.o.b. mill)

	Nickel	Monel
Sheets, cold-rolled.....	54	43
No. 35 sheets.....	41	
Strip, cold-rolled.....	60	44
Rod.....		
Hot-rolled.....	50	39
Cold-drawn.....	55	44
Angles, hot-rolled.....	50	39
Plates.....	52	41
Seamless tubes.....	83	71
Shot and blocks.....		31

Zinc

(Cents per lb, f.o.b. mill)

Sheet, L.C.I.....	15.40
Ribbon, ton lots.....	14.50
Plates.....	
Small.....	13.25
Large, over 12 in.....	14.25
Lithographic, ungrained.....	17.25

Copper, Brass, Bronze

(Cents per lb)

	Extruded Shapes	Rods	Sheets
Copper.....	30.78		30.93
Copper, hot-rolled.....	27.23		
Copper, drawn.....	28.23		
Low brass, 80 pct.....	37.52	28.71	29.02
High brass.....	36.03	27.22	27.53
Red brass, 85 pct.....	38.03	29.22	29.53
Naval brass.....	27.50	26.25	32.19
Brass, free cutting.....	22.28		
Commercial bronze.....	39.06	30.25	30.56
Manganese bronze.....	31.07	29.57	35.69
Phosphor bronze, 5 pct.....		49.07	48.82
Muntz metal.....	27.19	25.94	30.38
Everdur, Herculey.....			
Olympic, etc.....	34.45	34.73	35.79
Nickel silver, 5 pct.....		38.11	36.34
Architectural bronze.....	26.01		

Scrap Metals

(Dealers' buying prices, f.o.b. New York)

Copper and Brass

(Cents per lb)

No. 1 heavy copper and wire.....	14½-15¼
No. 2 heavy copper and wire.....	13½-14¼
Light copper.....	12½-12¾
Auto radiators (unsweated).....	12-12¼
No. 1 composition.....	14½-14¾
No. 1 composition turnings.....	13½-13¾
Clean red car boxes.....	11-11½
Clocks and faucets.....	11½-12
Mixed heavy yellow brass.....	9½-10
Old rolled brass.....	8½-9¼
Brass pipe.....	10¼-10¾
New soft brass clippings.....	11-11½
Brass rod ends.....	9½-10¼
No. 1 brass rod turnings.....	10-10½

Aluminum

(Cents per lb)

Alum. pistons with struts.....	4½-5
Aluminum crankcases.....	7¼-7½
2S aluminum clippings.....	8-8¼
Old alum. Sheet & utensils.....	7½-8
Mixed alum. borings and turnings.....	2-2½
Misc. cast aluminum.....	7-7½
Dural clips (24S).....	6-6½

Zinc

(Cents per lb)

New zinc clippings.....	7-7½
Old zinc.....	5¼-5¾
Zinc routings.....	3-3½
Old die cast scrap.....	3-3½

Nickel and Monel

(Cents per lb)

Pure nickel clippings.....	18-19
Clean nickel turnings.....	14-15
Nickel anodes.....	16½-17½
Nickel rod ends.....	17-18
New Monel clippings.....	15-16
Clean Monel turnings.....	10-10½
Old sheet Monel.....	12-12½
Old Monel castings.....	10-11
German silver clippings, mixed.....	10½-11
German silver turnings, mixed.....	7-7½

Lead

(Cents per lb)

Soft scrap lead.....	9½-10
Battery plates (dry).....	5¼-5½

Miscellaneous

(Cents per lb)

Block tin.....	60-
No. 1 pewter.....	46-48
No. 1 auto babbitt.....	36-37
Mixed common babbitt.....	12-12½
Solder joints.....	13
Siphon foundry.....	30-32
Small foundry type.....	15-15½
Monotype.....	12½-13
Lino and stereotype.....	12-12½
Electrotype.....	10-10½
New type shell cuttings (nom.).....	11-11½
Clean hand picked type shells.....	5-5½
Lino and stereo dross.....	5½-6
Electro dross.....	3½-4

Lead Products

(Cents per lb)

F.o.b. shipping point freight collect. Freight equalized with nearest free delivery point.....	
Full lead sheets.....	14.90
Cut lead sheets.....	15.40
Lead pipe, manufacturing point.....	14.15
Lead traps and bends.....	List +33 1/3%
Combination lead and iron bends and ferrules, also combination lead and iron ferrules.....	List +33 1/3%
Drum traps, U.S. list.....	List +33 1/3%
Montclair traps.....	List +33 1/3%
Lead burned bath traps.....	List +60%
Lead wool.....	16.30
Calking lead.....	13.30

Openhearth Prices Firm Despite Pressure

New York

• • • The most disturbing factor in this week's scrap market is the apparent willingness of a few mills to pay more than the \$5 a ton increase over the former ceilings for heavy melting steel. Some buyers are reportedly paying low phos premiums just as they did during the latter months of OPA. However, resistance on the part of major consumers, coupled with the cut in operations due to the coal strike have so far prevented a rise in market prices.

Among the factors tending to hold openhearth steel prices at their present level, according to trade sources, is the practice of some railroads of awarding their lists at \$5 over the old price and ignoring higher bids.

Prices on cast scrap, which had given forth signs of running away, have steadied somewhat with increased consumer resistance. Foundries fear shutdowns due to pig iron shortages and a possible railroad embargo and feel that these factors are sufficient to warrant a cautious attitude.

PITTSBURGH—The scrap market has simmered down, largely the result of curtailed operations during the coal strike, to a market where buyer resistance is holding prices to the \$5.00 advance that occurred a week after OPA relinquished its controls. Prices are holding firm on the heavy steel mill grades, while the prices on cast grades are fluctuating mildly, reflecting mainly spot offers rather than sustained business on contract. Some consumers have gone out of the turnings market because the \$5.00 advance is too much for them. The commotion caused by the delay in announcing awards on the Pennsylvania R.R. scrap list may mean that this scrap producer and perhaps others will eliminate bid lists and sell on a negotiated price basis. This, of course, is speculative, but such action would not surprise anyone in the trade. Some billet and bloom crop sales at \$30 have been reported, as well as some crushed pipe tonnages at \$29. There is a strong undertone to the general scrap market, and a greater quantity of scrap moving would probably cause an upward movement of prices. While no sales have been made on low phos at \$28 to \$28.50, mainly because of scarcity of the item, tonnages could be moved at that price.

CHICAGO—The practice of some railroads of selling some scrap at \$5 a ton over the old ceiling and other scrap at anything they can get has kept the mar-

ket very unsettled. Earmarked tonnages have not been as great as those which have moved on the open market at the higher price. Foundries are still after cast but their shrinking pig iron supplies are tempering the demand. The last list on heavy melting went at \$24.75 despite offers to buy at \$1.75 above that price. Some of the brokers who sold to the mills at \$25.25 delivered are not yet fully covered.

PHILADELPHIA—Although the operating rate is very low in this district due to the pig iron shortage, all mills are seeking scrap before a freight embargo cuts off shipments. Since most of the eastern Pennsylvania mills are oil fired, there is no immediate shortage of furnace fuel. However, it is expected that the operations must be reduced considerably during the next few weeks. Scrap prices hold their previous levels.

NEW YORK—Shipments of openhearth steel are being shifted by brokers here to some mills still able to operate at good levels but there has been no lessening of demand, according to sources here. A few mills appear willing to pay more than the going prices, resorting to the old low phos dodge, but most buyers and sellers are holding the price line. Cast is up slightly on bidding by some New Jersey foundries but dwindling pig iron supplies have kept some out of the market while others are still showing price resistance.

DETROIT—All recent automotive lists have been sold at prices approximately \$5 over the previous ceilings. With production scrap allocated to mills, no short sales are being made and a free market exists in name only. Foundry scrap continues tight and spotty with most sales going as No. 1 cupola. Sales of cupola cast in limited quantity have been reported as high as \$45 per ton gross.

There is some indication that pressure is being applied to raise foundry grades but the evidence is not yet sufficiently convincing to warrant an upward revision of the present quotation.

CLEVELAND—Regardless of the coal strike, major consumers of scrap in this area are in a comfortable inventory position, with as much as 45-days' supply on the ground in some cases. Present plans are to continue to take shipments as long as the railroads will haul them in. While there has been no appreciable change in shipments, at least one mill is buying on 10-day contracts, and the general scrap price structure is about the same.

BOSTON—The cast market has calmed down and prices are now on an established basis. Compared with a week ago there has been some adjustment. Broker interest centers in a local Navy Yard sale Dec. 10 including many lots of miscellaneous scrap. Outstanding items are 250 tons steel lockers, etc.; 200 tons wire cable; 250 tons bunk frames; and 100 tons galvanized chain.

BUFFALO—The market was quiet and firm this week except in the cast section where limited supplies commanded fantastic prices of \$35 to \$40 a ton. The principal foundries, however, declined to follow the spiral and held their bids at \$28.50. Gradual curtailment of plant operations because of the coal strike was expected to be reflected in industrial scrap shipments toward the end of the week. Some dealers reported a growing tendency to hold back shipments at this time on account of taxes.

CINCINNATI—While there has been a moderate increase in the available supply of scrap iron and steel, it has not been sufficient to meet the heavy demand for both steel and cast grades of scrap. Prices have not been changed, but dealers and brokers believe that should a sufficient supply become available to establish any kind of a market, unquestionably they would be revised upward.

ST. LOUIS—Receipts continue on a small scale as outside dealers still are withholding shipments in the hope of better prices and also to wait until another tax year begins. Two railroad lists, the first since decontrol, closed last week, 40 carloads of the St. Louis-San Francisco and 55 carloads for Missouri Pacific but no awards have been made. It is understood the railroads have received higher bids than the \$5 increase generally in effect since decontrol but may make sales on the \$5 basis for fear that they may have to pay higher prices for finished goods.

BIRMINGHAM—The scrap market remains very strong here with demand particularly heavy for cast grades. Unless the coal strike ends soon most of the pipe shops in this area face a shutdown through inability to obtain cast or pig iron.

TORONTO—Ceiling prices continue to prevail on all scrap iron and steel materials with the result that Canadian scrap prices, which under normal conditions usually have topped those in the United States, now are running \$6 to \$7 per ton under the American quotations. However, there is a similar price spread on finished steel and steel products as a result of the Canadian ceilings. Scrap dealers do not believe that higher prices would stimulate offerings of scrap in this country, and point out that the scrap is not available. There have been no indications of hoarding for higher prices.

Sells Surplus Scrap Plant

Washington

• • • WAA has sold for \$41,100 cash a surplus war plant in Pittsburg, Calif., to the California Scrap Iron Corp., wartime operator. The plant was used during the war for the collection and preparation of scrap.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$25.00 to \$25.50
RR. hvy. melting	26.00 to 26.50
No. 2 hvy. melting	25.00 to 25.50
RR. scrap rails	26.50 to 27.00
Rails 3 ft. and under	28.50 to 29.00
No. 1 comp'd bundles	25.00 to 25.50
Hand bldd. new shfts.	25.00 to 25.50
Hvy. axle turn.	24.50 to 25.00
Hvy. steel forge turn.	24.50 to 25.00
Mach. shop turn.	20.00 to 20.50
Short shov. turn.	22.00 to 22.50
Mixed bor. and turn.	20.00 to 20.50
Cast iron borings	20.00 to 20.50
No. 1 cupola cast	34.00 to 35.00
Heavy breakable cast	25.00 to 25.50
Malleable	29.00 to 29.50
RR. Knuck. and coup.	30.00 to 30.50
RR. coil springs	30.00 to 30.50
Rail leaf springs	30.00 to 30.50
Roller steel wheels	30.00 to 30.50
Low phos.	27.50 to 28.00

CHICAGO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$25.00 to \$25.50
No. 2 hvy. melting	25.00 to 25.50
No. 1 bundles	25.00 to 25.50
No. 2 dealers' bndls.	25.00 to 25.50
Bundled mach. shop turn.	25.00 to 25.50
Galv. bundles	21.50 to 22.00
Mach. shop turn.	18.75 to 19.25
Short shovels, turn.	20.75 to 21.25
Cast iron borings	19.75 to 20.25
Mix. borings & turn.	18.50 to 19.00
Low phos. hvy. forge	28.00 to 30.00
Low phos. plates	26.50 to 27.50
No. 1 RR. hvy. melt.	24.75 to 26.50
Reroll rails	33.00 to 33.50
Miscellaneous rails	33.00 to 33.50
Angles & splice bars	28.50 to 29.00
Locomotive tires, cut	24.25*
Cut bolsters & side frames	28.50 to 29.00
Standard stl. car axles	29.50 to 31.00
No. 3 steel wheels	28.50 to 29.00
Couplers & knuckles	28.50 to 29.00
Malleable	35.00 to 40.00
No. 1 mach. cast.	37.50 to 42.00
Rails 3 ft. and under	32.00 to 32.50
No. 1 agricul. cast.	30.00 to 35.00
Hvy. breakable cast.	30.00 to 35.00
RR. grate bars	31.50 to 32.00
Cast iron brake shoes	30.25 to 30.50
Stove plate	33.50 to 34.00
Clean auto cast.	27.00*
Cast iron carwheels	30.50 to 31.00

CINCINNATI

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

No. 1 hvy. melting	\$23.70
No. 2 hvy. melting	23.70
No. 1 bundles	23.70
No. 2 bundles	23.70
Mach. shop turn.	\$15.50 to 16.00
Shoveling turn.	17.50 to 18.00
Cast iron borings	16.50 to 17.00
Mixed bor. & turn.	16.50 to 17.00
Low phos. plate	27.00
No. 1 cupola cast	30.00
Hvy. breakable cast.	25.00
Stove plate	28.00
Scrap rails	26.00

BOSTON

Dealers' buying prices per gross ton, f.o.b. cars

No. 1 hvy. melting	\$20.35
No. 2 hvy. melting	20.35
Nos. 1 and 2 bundles	20.35
Bushellings	20.35
Turnings, shoveling	\$17.00 to 17.35
Machine shop turn.	15.00 to 15.35
Mixed bor. & turn.	15.00 to 15.35
Cl'n cast, chem. bor.	16.50 to 17.00
No. 1 machinery cast	40.00
Heavy breakable cast	35.00
Stove plate	40.00

DETROIT

Per gross ton, brokers' buying prices:

No. 1 hvy. melting	\$22.32
No. 2 hvy. melting	22.32
No. 1 bundles	22.32
New bushelling	22.32
Flashings	22.32
Mach. shop turn	17.32
Short shov. turn	19.32

Going prices as obtained in the trade by IRON AGE editors, based on representative tonnages. Pending establishment of a market in some districts and in certain grades, the former OPA ceiling price is inserted for reference, followed by an asterisk.

Cast iron borings	18.32
Mixed bor. & turn.	17.32
Low phos. plate	24.82
No. 1 cupola cast.	\$35.00 to 40.00
Charging box cast	30.00 to 32.00
Hvy. breakable cast	29.00 to 31.00
Stove plate	33.00 to 35.00
Automotive cast.	35.00 to 40.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$24.00 to \$25.00
No. 2 hvy. melting	24.00 to 25.00
No. 1 bundles	24.00 to 25.00
No. 2 bundles	24.00 to 25.00
Mach. shop turn.	18.75 to 19.25
Shoveling turn.	21.25 to 21.75
Cast iron borings	18.75 to 19.25
Mixed bor. & turn.	18.75 to 19.25
No. 1 cupola cast	40.00 to 41.00
Hvy. breakable cast	35.00 to 36.00
Cast. charging box	36.00 to 37.00
Clean auto cast	40.00 to 41.00
Hvy. axle forge turn.	23.25 to 23.75
Low phos. plate	26.50 to 27.50
Low phos. punchings	26.50 to 27.50
RR. steel wheels	26.50 to 27.50
RR. coil springs	26.50 to 27.50
RR. malleable	34.00 to 35.00

ST. LOUIS

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$22.50
Bundled sheets	22.50
Mach. shop turn.	15.50
Locomotive tires, uncut.	23.50
Misc. std. sec. rails	24.00 to 24.50
Rerolling rails	26.00 to 26.50
Steel angle bars	24.00 to 24.50
Rails 3 ft. and under	26.50 to 27.00
RR. springs	26.50 to 27.00
Steel car axles	29.50 to 30.00
Stove plate	25.00 to 27.00
Grate bars	25.00
Brake shoes	22.75
Malleable	29.00 to 29.50
Cast iron carwheels	27.00 to 27.50
No. 1 machinery cast.	30.00 to 32.50
Breakable cast.	25.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$22.00 to \$23.50
No. 2 hvy. melting	22.00 to 22.50
No. 2 bundles	22.00 to 22.50
No. 1 busheling	22.00 to 22.50
Long turnings	15.00 to 16.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	16.00 to 17.00
Bar crops and plate	24.18 to 25.18
Structural and plate	24.18 to 25.18
No. 1 cast	34.00 to 38.00
Stove plate	30.00 to 35.00
Steel axles	23.00 to 23.50
Scrap rails	24.50 to 25.00
Rerolling rails	26.50 to 27.00
Angles & splice bars	25.50 to 26.50
Rails 3 ft & under	26.50 to 27.00
Cast iron carwheels	22.00*

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$25.00 to \$25.50
No. 2 hvy. melting	25.00 to 25.50
Low phos. plate	27.50 to 28.00
No. 1 bushelling	23.00 to 23.50
Hydraulic bundles	25.00 to 25.50
Mach. shop turn.	20.00 to 20.50
Short. shov. turn.	22.00 to 22.50
Cast iron borings	21.00 to 21.50

NEW YORK

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	\$20.33
No. 2 hvy. melting	20.33
Comp. black bundles	20.33
Comp. galv. bundles	18.33
Mach. shop turn.	15.33
Mixed bor. & turn.	15.33
Shoveling turn.	17.33
No. 1 cupola cast	\$35.00 to 37.00
Hvy. breakable cast.	25.00 to 27.00

Charging box cast	35.00 to 37.00
Stove plate	35.00 to 37.00
Clean auto cast.	35.00 to 37.00
Unstrip. motor blks.	25.00 to 27.00
Cl'n chem. cast bor.	19.33

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$24.25 to \$24.75
No. 1 bundles	24.25 to 24.75
No. 2 bundles	24.25 to 24.75
No. 2 hvy. melting	24.25 to 24.75
Mach. shop turn.	18.75 to 19.25
Shoveling turn.	20.75 to 21.25
Cast iron borings	19.75 to 20.25
Mixed bor. & turn.	18.75 to 19.25
No. 1 cupola cast.	28.00 to 30.00
Charging box cast.	24.00 to 26.00
Stove plate	26.00 to 28.00
Clean auto cast.	28.00 to 30.00
Malleable	29.00 to 29.50
Low phos. plate	27.00 to 29.00
Scrap rails	25.75 to 26.25
Rails 3 ft. & under	27.75 to 28.25
RR. steel wheels	28.75 to 29.25
Cast iron carwheels	27.00 to 27.50
RR. coil & leaf spgs.	28.75 to 29.25
RR. knuckles & coup.	28.75 to 29.25
No. 1 busheling	24.25 to 24.75

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. melting	\$24.50 to \$25.00
No. 2 hvy. melting	24.50 to 25.00
Compressed sheet stl.	24.50 to 25.00
Drop forge flashings	24.00 to 24.50
No. 2 bundles	24.50 to 25.00
Mach. shop turn.	19.50 to 20.00
Short shovel.	21.50 to 22.00
No. 1 busheling	24.50 to 25.00
Steel axle turn.	24.00 to 24.50
Cast iron borings	20.50 to 21.00
Mixed bor. & turn.	19.50 to 20.00
No. 2 busheling	22.00 to 22.50
No. 1 machinery cast	34.50 to 35.00
Malleable	32.50 to 33.00
Railroad cast	34.50 to 35.00
Railroad grate bars	29.50 to 30.00
Stove plate	32.00 to 32.50
RR. hvy. melting	25.50 to 26.00
Rails 3 ft. & under	31.50 to 32.00
Rails 18 in. & under	33.50 to 34.00
Rails for rerolling	30.50 to 31.00
Elec. furnace punch	27.00 to 27.50

SAN FRANCISCO

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 hvy. melting	\$19.50
No. 2 hvy. melting	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
Elec. furn. 1 ft. und.	19.50*
No. 1 cupola cast	25.00*
RR. hvy. melting	20.50

LOS ANGELES

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 hvy. melting	\$19.50
No. 2 hvy. melting	19.50
No. 1 bales	19.50
No. 2 bales	19.50
No. 3 bales	16.00
Mach. shop turn.	13.00
No. 1 cupola cast	25.00
RR. hvy. melting	20.50

SEATTLE

Per gross ton delivered to consumer:

Cast grade f.o.b. shipping point

No. 1 & No. 2 hvy. melting	\$17.00
Elec. furn. 1 ft. und.	17.00
No. 1 cupola cast	25.00*
RR. hvy. melting	16.00

HAMILTON, ONT.

Per gross ton delivered to consumer:

Cast grades f.o.b. shipping point

Heavy melting	\$17.50*
No. 1 bundles	17.50*
No. 2 bundles	17.00*
Mixed steel scrap	15.50*
Rails, remelting	18.50*
Rails, rerolling	21.50*
Bushellings	13.00*
Mixed borings & turnings	12.50*
Electric furnace bundles	20.50*
Manganese steel scrap	20.00*
No. 1 cast	19.00*
Stove plate	17.50*
Car wheels, cast	19.50*
Malleable iron	16.00*

Comparison of Prices . .

Advances over past week in Heavy Type, declines in *Italics*. Prices are f.o.b. major basing points. The various basing points for finished and semifinished steel are listed in the detailed price tables.

Flat-Rolled Steel:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(cents per pound)	1946	1946	1946	1945
Hot-rolled sheets	2.425	2.425	2.425	2.20
Cold-rolled sheets	3.275	3.275	3.275	3.05
Galvanized sheets (24 ga.)	4.05	4.05	4.05	3.70
Hot-rolled strip				
6-in and under	2.45	2.45	2.45	2.10
Over 6 in.	2.35	2.35	2.35	2.10
Cold-rolled strip	3.05	3.05	3.05	2.80
Plates	2.50	2.50	2.50	2.25
Plates, wrought iron	4.112	4.112	4.112	3.80
Stain's c-r strip (No. 302)	30.30	30.30	30.30	28.00

Tin and Ternplate:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(dollars per base box)				
Tinplate, standard cokes..	\$5.00	\$5.00	\$5.00	\$5.00
Tinplate, electro (0.50 lb)	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30

Bars and Shapes:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(cents per pound)				
Merchant bars	2.50	2.50	2.50	2.25
Cold-finished bars	3.10	3.10	3.10	2.75
Alloy bars	2.92	2.92	2.92	2.70
Structural shapes	2.35	2.35	2.35	2.10
Stainless bars (No. 302)	25.97	25.97	25.97	24.00
Wrought iron bars	4.76	4.76	4.76	4.40

Wire and Wire Products:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(cents per pound)				
Bright wire	3.05	3.05	3.05	2.75
Wire nails	3.75	3.75	3.75	2.90

Rails:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(dollars per net ton)				
Heavy rails	\$43.39	\$43.39	\$43.39	\$43.00*
Light rails	49.18	49.18	49.18	45.00*
*per gross ton				

Semifinished Steel:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(dollars per gross ton)				
Rerolling billets	\$39.00	\$39.00	\$39.00	\$36.00
Sheet bars	38.00	38.00	38.00	36.00
Slabs, rerolling	39.00	39.00	39.00	36.00
Forging billets	47.00	47.00	47.00	42.00
Alloy blooms, billets, slabs	58.43	58.43	58.43	54.00

Wire Rods and Skelp:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(cents per pound)				
Wire rods	2.30	2.30	2.30	2.15
Skelp	2.05	2.05	2.05	1.90

*Pig Iron:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(per gross ton)				
No. 2 foundry, Phila....	\$30.43	\$30.43	\$30.43	\$27.59
No. 2, Valley furnace....	28.50	28.50	28.50	25.75
No. 2, Southern, Cin'ti...	27.80	27.80	27.80	26.19
No. 2, Birmingham	24.88	24.88	24.88	22.13
No. 2 foundry, Chicago†	28.50	28.50	28.50	25.75
Basic, del'd eastern Pa...	29.93	29.93	29.93	27.09
Basic, Valley furnace....	28.00	28.00	28.00	25.25
Malleable, Chicago†	28.50	28.50	28.50	25.75
Malleable Valley	28.50	28.50	28.50	25.75
L. S. charcoal, Chicago..	42.34	42.34	42.34	42.34
Ferromanganese†	135.00	135.00	135.00	135.00

† The switching charge for delivery to foundries in the Chicago district is 60¢ per ton.

† For carlots at seaboard.

* Prices retroactive to May 29; the price increase should be reflected in THE IRON AGE Comparison of Prices table since June 4.

Scrap:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(per gross ton)				
Heavy melt'g steel, P'gh.	\$25.25	\$25.25	\$20.00	\$20.00
Heavy melt'g steel, Phila.	24.50	24.50	18.75	18.75
Heavy melt'g steel, Ch'go	25.25	25.25	18.75	18.75
No. 1 hy. comp. sheet, Det.	22.32	22.32	17.32	17.32
Low phos. plate, Youngs'n	27.75	27.75	22.50	22.50
No. 1 cast, Pittsburgh...	29.00	29.00	25.00	20.00
No. 1 cast, Philadelphia..	40.50	40.50	25.00	20.00
No. 1 cast, Chicago.....	37.75	37.75	25.00	20.00

Coke, Connellsville:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(per net ton at oven)				
Furnace coke, prompt....	\$8.75	\$8.75	\$8.75	\$7.50
Foundry coke, prompt...	8.50	8.50	8.50	9.00

Nonferrous Metals:	Dec. 3, 1946	Nov. 26, 1946	Oct. 29, 1946	Dec. 4, 1945
(cents per pound to large buyers)				
Copper, electro., Conn....	19.50	19.50	14.375	12.00
Copper, Lake, Conn.....	19.625	19.625	14.375	12.00
Tin, Straits, New York....	70.00	70.00	52.00	52.00
Zinc, East St. Louis.....	10.50	10.50	9.25	8.25
Lead, St. Louis.....	11.65	11.65	8.10	6.35
Aluminum, virgin	15.00	15.00	15.00	15.00
Nickel, electrolytic		35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	20.50
Antimony, Laredo, Tex...	23.50	23.50	14.50	14.50

Starting with the issue of Apr. 22, 1943, the weighted finished steel index was revised for the years 1941, 1942 and 1943. See explanation of the change on p. 90 of the Apr. 22, 1943, issue. Index revised to a quarterly basis as of Nov. 16, 1944; for details see p. 98 of that issue. The finished steel composite prices for the current quarter are an estimate based on finished steel shipments for the previous quarter. These figures will be revised when the actual data of shipments for this quarter are compiled.

Composite Prices . .

FINISHED STEEL

Dec. 3, 1946	2.70711¢ per lb.
One week ago	2.70711¢ per lb.
One month ago	2.70711¢ per lb.
One year ago	2.44104¢ per lb.

HIGH	LOW
1946... 2.73011¢ July 4	2.54490¢ Jan. 1
1945... 2.44104¢ Oct. 2	2.38444¢ Jan. 2
1944... 2.30837¢ Sept. 5	2.21189¢ Oct. 5
1943... 2.29176¢	2.29176¢
1942... 2.28249¢	2.28249¢
1941... 2.43078¢	2.43078¢
1940... 2.30467¢ Jan. 2	2.24107¢ Apr. 16
1939... 2.35367¢ Jan. 3	2.26689¢ May 16
1938... 2.58414¢ Jan. 4	2.27207¢ Oct. 18
1937... 2.58414¢ Mar. 9	2.32263¢ Jan. 4
1936... 2.32263¢ Dec. 28	2.05200¢ Mar. 10
1935... 2.07642¢ Oct. 1	2.06492¢ Jan. 8
1934... 2.15367¢ Apr. 24	1.95757¢ Jan. 2
1933... 1.95578¢ Oct. 3	1.75836¢ May 2
1932... 1.89196¢ July 5	1.83901¢ Mar. 1
1931... 1.99626¢ Jan. 13	1.86586¢ Dec. 29
1930... 2.25488¢ Jan. 7	1.97319¢ Dec. 9
1929... 2.31773¢ May 28	2.26498¢ Oct. 29

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 pct of the United States output. Index recapitulated in Aug. 28, 1941, issue.

PIG IRON

.....\$28.13 per gross ton....
.....\$28.13 per gross ton....
.....\$28.13 per gross ton....
.....\$25.37 per gross ton....

HIGH	LOW
\$28.13 May 29	\$25.37 Jan. 1
25.37 Oct. 23	23.61 Jan. 2
\$23.61	\$23.61
23.61	23.61
23.61	23.61
\$23.61 Mar. 20	\$23.45 Jan. 2
23.45 Dec. 23	22.61 Jan. 2
22.61 Sept. 13	20.61 Sept. 12
23.25 June 21	19.61 July 6
23.25 Mar. 9	20.25 Feb. 15
19.74 Nov. 24	18.73 Aug. 11
18.84 Nov. 5	17.83 May 14
17.90 May 1	16.90 Jan. 27
16.90 Dec. 5	13.56 Jan. 3
14.81 Jan. 5	13.56 Dec. 6
15.90 Jan. 6	14.79 Dec. 15
18.21 Jan. 7	15.90 Dec. 16
18.71 May 14	18.21 Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

SCRAP STEEL

.....\$25.00 per gross ton....
.....\$24.75 per gross ton....
.....\$19.17 per gross ton....
.....\$19.17 per gross ton....

HIGH	LOW
\$25.00 Nov. 26	\$19.17
19.17 Jan. 2	\$18.92 May 22
19.17 Jan. 11	15.76 Oct. 24
\$19.17	\$19.17
19.17	19.17
\$22.00 Jan. 7	\$19.17 Apr. 10
21.83 Dec. 30	16.04 Apr. 9
22.50 Oct. 3	14.08 May 16
15.00 Nov. 22	11.00 June 7
21.92 Mar. 30	12.67 June 9
17.75 Dec. 21	12.67 June 8
13.42 Dec. 10	10.33 Apr. 29
13.00 Mar. 13	9.50 Sept. 25
12.25 Aug. 8	6.75 Jan. 3
8.50 Jan. 12	6.43 July 5
11.33 Jan. 8	8.50 Dec. 29
15.00 Feb. 18	11.25 Dec. 9
17.58 Jan. 29	14.08 Dec. 3

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia, and Chicago.

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Unichrome Stop-Off Lacquers and Compounds • Unichrome Dips
Unichrome Rack Coatings • Anozinc® Compounds • Unichrome Strip
*Trade Mark Reg. U. S. Pat. Off.

Iron and Steel Prices...

Steel prices shown here are f.o.b. basing points, in cents per pound or dollars per gross ton. Extras apply. Delivered prices do not reflect 3 pct tax on freight. (1) Mill run sheet, 10¢ per 100 lb under base; primes, 25¢ above base. (2) Unassorted commercial coating. (3) Widths up to 12-in. inclusive. (4) 0.25 carbon and less. (5) Applies to certain width and length limitations. (6) For merchant trade. (7) For straight length material only from producer to consumer. Discount of 25¢ per 100 lb to fabricators. (8) Also shafting. For quantities of 20,000 lb to 39,999 lb. (9) Carload lot in manufacturing trade. (10) Prices do not apply if rail and water is not used. (11) Boxed. (12) This base price for annealed, bright finish wires, commercial spring wire. (13) Produced to dimensional tolerances in AISI Manual Sect. 6. (14) Billets only. (15) 9/82 in. to 47/64 in., 0.15¢ per lb higher.

Basing Points	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	10 Pacific Ports, Cars	DELIVERED TO		
													Detroit	New York	Phila- delphia
INGOTS															
Carbon, re-rolling															
Carbon, forging	\$38	\$38	\$38	\$38	\$38	\$38	\$38								
Alloy.....	\$48.69	\$48.69				\$48.69									
BILLETS, BLOOMS, SLABS															
Carbon, re-rolling	\$39	\$39	\$39	\$39	\$39							\$51.50 ¹⁴	\$41.50		
Carbon, forging billets.....	\$47	\$47	\$47	\$47	\$47	\$47	\$47					\$59.50 ¹⁴	\$49.50		
Alloy	\$58.43	\$58.43				\$58.43							\$60.93		
SHEET BARS	\$38	\$38		\$38		\$38	\$38	\$38							
PIPE SKELP	2.05¢	2.05¢					2.05¢	2.05¢							
WIRE RODS ¹⁵ No. 5 to 3/32 in.	2.30¢	2.30¢		2.30¢	2.30¢							2.585¢	2.835¢		
SHEETS															
Hot-rolled	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.425¢	2.875¢	2.50¢		3.01¢	2.56¢	2.685¢	2.61¢
Cold-rolled ¹	3.275¢	3.275¢	3.275¢	3.275¢		3.275¢	3.275¢		3.375¢			3.96¢	3.41¢	3.635¢	3.635¢
Galvanized (24 gage)	4.05¢	4.05¢	4.05¢		4.05¢	4.05¢	4.05¢	4.05¢	4.50¢			4.635¢		4.31¢	4.24¢
Enameling (20 gage)	3.80¢	3.80¢	3.80¢	3.80¢			3.80¢		3.90¢			4.485¢	3.935¢	4.20¢	4.18¢
Enameling (10 Gage)	3.20¢	3.20¢	3.20¢	3.20¢			3.20¢		3.30¢			3.885¢	3.335¢	3.60¢	3.56¢
Long ternes ²	4.05¢	4.05¢	4.05¢									4.835¢		4.45¢	4.41¢
STRIP															
Hot-rolled 3/16 in. and under over 6 in.	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢	2.45¢ 2.35¢		2.45¢ 2.35¢			2.45¢ 2.35¢		3.135¢ 3.035¢	2.585¢ 2.485¢	2.85¢ 2.75¢	2.81¢ 2.71¢
Cold-rolled ⁴	3.05¢	3.15¢		3.05¢			3.05¢						3.185¢	3.45¢	3.41¢
Cooperage stock	2.55¢	2.55¢		2.55¢			2.55¢							2.95¢	
TINPLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00		\$5.10			\$5.10	\$5.10					\$5.375	\$5.301
Electro, box (0.25 lb 0.50 lb 0.75 lb)															
BLACKPLATE 29 gage ⁵	3.30¢	3.30¢	3.30¢					3.40¢	3.40¢					3.67¢	3.59¢
TERNES, MFG. Special coated, base box															
CAN MAKING QUALITY Blackplate 55 to 70 lb															
BARS															
Carbon steel	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		(Duluth=2.60¢) (Provo, Utah=3.20¢)		2.885¢	3.185¢	2.635¢	2.84¢	2.86¢
Rail steel ⁶	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢					2.885¢	3.185¢			
Reinforcing (billet) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢			2.735¢	2.785¢	2.485¢	2.61¢	2.69¢
Reinforcing (rail) ⁷	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢	2.35¢				2.735¢	2.785¢	2.485¢		
Cold-finished ⁸	3.10¢	3.10¢	3.10¢	3.10¢		3.10¢								3.44¢	3.46¢
Alloy, hot-rolled	2.92¢	2.92¢				2.92¢	2.92¢						3.055¢		
Alloy, cold-drawn	3.62¢	3.62¢	3.62¢	3.62¢		3.62¢							3.765¢		
PLATE															
Carbon steel ¹³	2.50¢	2.50¢	2.50¢	2.50¢	2.50¢		2.50¢	2.50¢		(Coatesville, Claymont=2.50¢; Geneva, Utah=2.85¢)	2.885¢	3.085¢	2.765¢	2.71¢	2.658¢
Floor plates	3.75¢	3.75¢									4.135¢	4.435¢		4.15¢	4.15¢
Alloy	3.79¢	3.79¢									4.305¢	4.525¢		4.01¢	3.895¢
SHAPES															
Structural	2.35¢	2.35¢	2.35¢		2.35¢	2.35¢			(Geneva, Utah=2.50¢) (Bethlehem=2.35¢)		2.735¢	3.035¢		2.54¢	2.48¢
SPRING STEEL, C-R 0.26 to 0.50 carbon	3.05¢			3.05¢					(Worcester=3.25¢)						
0.51 to 0.75 carbon	4.65¢			4.65¢					(Worcester=4.85¢)						
0.76 to 1.00 carbon	6.65¢			6.65¢					(Worcester=6.85¢)						
1.01 to 1.25 carbon	9.03¢			9.03¢					(Worcester=9.23¢)						
WIRE ⁹ Bright ¹²	3.05¢	3.05¢		3.05¢	3.05¢				(Worcester=3.15¢) (Duluth=3.10¢)		3.585¢		3.44¢	3.41¢	
Galvanized									Add proper size extra and galvanizing extra to Bright Wire Base						
Spring (high carbon)	4.00¢	4.00¢		4.00¢					(Worcester=4.10¢) (Trenton=4.25¢)		4.535¢		4.39¢	4.339¢	
PILING Steel sheet	2.65¢	2.65¢				2.65¢					3.235¢		2.99¢	3.01¢	

PRICES

CORROSION AND HEAT RESISTANT STEELS

In cents per pound, f.o.b. basing point

BASING POINT	Chromium Nickel		Straight Chromium			
	No. 304	No. 302	No. 410	No. 430	No. 442	No. 448
Ingot, Pgh, Chi, Canton, Balt, Reading, Ft. Wayne, Phila.	Subject to negotiation	22.99	24.67	17.01	17.47	20.69
Blooms, Pgh, Chi, Canton, Phila, Reading, Ft. Wayne, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Slabs, Pgh, Chi, Canton, Balt, Phila, Reading.	Subject to negotiation	22.99	24.67	17.01	17.47	20.69
Billets, Pgh, Chi, Canton, Watervliet, Syracuse, Balt.	22.99	24.67	17.01	17.47	20.69	25.29
Billets, forging, Pgh, Chi, Canton, Dunkirk, Balt, Phila, Reading, Watervliet, Syracuse.	22.99	24.67	17.01	17.47	20.69	25.29
Ft. Wayne, Titusville.	27.05	25.97	20.02	20.56	24.34	29.75
Bars, h-r, Pgh, Chi, Canton, Dunkirk, Watervliet, Syracuse, Balt, Phila, Reading.	27.05	25.97	20.02	20.56	24.34	29.75
Ft. Wayne, Titusville.	27.05	25.97	20.02	20.56	24.34	29.75
Bars, c-f, Pgh, Chi, Clevel, Canton, Dunkirk, Syracuse, Balt, Phila, Reading.	27.05	25.97	20.02	20.56	24.34	29.75
Ft. Wayne, Watervliet.	31.38	29.21	23.28	23.80	28.67	33.90
Plates, Pgh, Middletown, Canton.	27.05	25.97	20.02	20.56	24.34	29.75
Shapes, structural, Pgh, Chi.	38.95	36.79	28.67	31.38	35.16	38.49
Sheets, Pgh, Chi, Middletown, Canton, Balt.	25.43	23.28	18.39	18.93	25.97	37.87
Strip, h-r, Pgh, Chi, Reading, Canton, Youngstown.	32.46	30.30	23.80	24.34	34.62	38.28
Strip, c-f, Pgh, Clevel, Newark, N. J., Reading, Canton, Youngstown.	27.05	25.97	20.02	20.56	24.34	29.75
Wire, c-d, Clevel, Dunkirk, Syracuse, Balt, Reading, Canton, Pgh, Newark, N. J., Phila.	32.46	30.30	23.80	24.34	34.62	38.28
Wire, flat, c-f, Clevel, Balt, Reading, Dunkirk, Canton.	27.05	25.97	20.02	20.56	24.34	29.75
Rod, h-r, Syracuse.	72.09	72.09	.....	68.49	.....	.....
Tubing, seamless, Pgh, Chi, Canton, (4 in. to 6 in.)	.....	.....	.....	.....	.....	.....

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse, Dunkirk. *Also Canton, O.)

An increase of 8.2 pct applies to base price and extras

	Base per lb
High speed	67¢
Straight molybdenum	54¢
Tungsten-molybdenum	57 1/2¢
High-carbon-chromium*	43¢
Oil hardening*	24¢
Special carbon*	22¢
Extra carbon*	18¢
Regular carbon*	14¢

Warehouse prices on and east of Mississippi are 2¢ per lb higher; west of Mississippi 3¢ higher.

ELECTRICAL SHEETS

Base, all grades f.o.b. Pittsburgh

	per lb
Field grade	3.90¢
Armature	4.25¢
Electrical	4.75¢
Motor	5.425¢
Dynamo	6.125¢
Transformer 72	6.625¢
Transformer 65	7.625¢
Transformer 58	8.125¢
Transformer 52	8.925¢

F.o.b. Chicago and Gary, field grade through motor; f.o.b. Granite City, add 10¢ per 100 lb on field grade to and including dynamo. Pacific ports add 75¢ per 100 lb on all grades.

RAILS, TRACK SUPPLIES

(F.o.b. mill)

Standard rails, heavier than 60 lb	
No. 1 O.H., net ton	\$43.39
Angle splice bars, 100 lb	2.85
(F.o.b. basing points)	per net ton
Light rails (from billets)	\$49.18
Light rails (from rail steel)	49.18
	base per lb
Cut spikes	4.50¢
Screw spikes	6.40¢
Tie plate, steel	2.55¢
Tie plates, Pacific Coast	2.70¢
Track bolts	6.50¢
Track bolts, heat treated, to rail-roads	6.75¢
Track bolts, jobbers discount	63-5

Basing points, light rails, Pittsburgh, Chicago, Birmingham; cut spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo. Cut spikes alone—Youngstown, Lebanon, Pa., Richmond, Oregon and Washington ports, add 25¢.

ROOFING TERNEPLATE

(F.o.b. Pittsburgh, 112 sheets) 20x14 in. 20x28 in.

8-lb coating I.C.	\$8.50	\$17.00
15-lb coating I.C.	9.50	19.00
30-lb coating I.C.	10.00	20.00

CLAD STEEL

Base prices, cents per pound

	Plate	Sheet
Stainless-clad		
No. 304, 20 pct, f.o.b. Pittsburgh, Washington, Pa.	21.00*	22.00
Nickel-clad		
10 pct, f.o.b. Coatesville, Pa.	18.72	.....
Inconel-clad		
10 pct, f.o.b. Coatesville..	26.00	.....
Monel-clad		
10 pct, f.o.b. Coatesville..	24.96	.....
Aluminized steel		
Hot dip, 20 gage, f.o.b. Pittsburgh	.....	9.00

*Includes annealing and pickling.

WIRE PRODUCTS

To the dealer, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham, Duluth

	Basing Points Named	Pacific Coast Basing Points†
	base per keg	
Standard wire nails	\$3.75	\$4.25
Coated nails	3.75	4.25
Cut nails, carloads	4.85	.....
	base per 100 lb	
Annealed fence wire	\$3.50	\$4.00
Annealed galv. fence wire	3.85	4.35
	base column	
Woven wire fence*	72	90
Fence posts, carloads...	74	91
Single loop bale ties††	72	97
Galvanized barbed wire**	79	89
Twisted barbed wire..	79	89

*15 1/2 gage and heavier. **On 80-road spools in carload quantities. †Prices subject to switching or transportation charges. ††Add 50¢ a ton.

HIGH TENSILE, LOW ALLOY STEELS

base prices, cents per pound

Steel	Aldecor	Corten	Double Strength No. 1	Dynalloy	Hi Steel	Mayari R	Otis-coley	Yoloy	Y-50
Producer	Republic	Carnegie-Illinois, Republic	Republic	Alan Wood	Inland	Bethlehem	Jones & Laughlin	Youngstown Sheet & Tube	American Rolling Mill
Plates.....	3.45	3.45	3.45	3.45	3.45	3.45	3.45	3.45	.....
Sheets									
Hot-rolled....	3.575	3.575	3.575	3.575	3.575	3.575	3.575	3.575	5.225*
Cold-rolled....	4.525	4.525	4.525	.....	4.525	4.525	4.525	4.525	.....
Galvanized....	.....	.....	.....	.....	.....	5.50	.....	.....	.....
Strip									
Hot-rolled									
Over 6-in.	3.60	3.60	3.60	.....	3.60	3.60	3.60	3.60	.....
6-in & under	3.70	3.70	3.70	.....	3.70	3.70	3.70	3.70	.....
Cold-rolled....	4.30	.....	4.30	.....	4.40	.....	4.30	4.30	8.00*
Commodity.	.....	.....	.....	.....	.....	.....	4.45	.....	.....
Shapes.....	.....	3.45	.....	.....	3.45	3.45	3.45	3.45	.....
Beams.....	.....	3.45	.....	.....	.....	3.45	.....	.....	.....
Bars									
Hot-rolled....	3.70	3.70	3.70	.....	.....	3.70	3.70	3.732††	.....
Cold rolled....	.....	.....	.....	.....	.....	.....	.....	4.382††	.....
Bar sh pos....	.....	3.85	.....	.....	3.85	3.85	3.85	3.85	.....
Billets, blooms, slabs (per gross ton)	.....	.....	.....	.....	.....	.....	.....	\$74.65†	.....
Structural	.....	.....	.....	.....	.....	.....	.....	\$82.23†	.....
Forging.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* 21 gage and lighter.

† Alloy extras apply.

‡ Add 0.379¢ for forging or heat treating grade.

PRICES

WELDED PIPE AND TUBING

Base discounts, f.o.b. Pittsburgh district and Lorain, Ohio, mills

(F.o.b. Pittsburgh only on wrought pipe)
Base price—\$200.00 per net ton

Steel (butt-weld)

	Black	Galv.
1/4-in.	60 1/2	48
1/2-in.	63 1/2	52
1-in. to 3-in.	65 1/2	54 1/2

Wrought Iron (butt-weld)

1/4-in.	17 1/2	+4 1/2
1/2-in.	24 1/2	2 1/2
1-in. and 1 1/4-in.	28 1/2	9 1/2
1 1/2-in.	33	11 1/2
2-in.	32 1/2	11 1/2

Steel (lap-weld)

2-in.	58	46 1/2
2 1/2-in. and 3-in.	61	49 1/2
3 1/2-in. to 6-in.	63	51 1/2

Wrought Iron (lap-weld)

2-in.	24 1/2	4 1/2
2 1/2-in. to 3 1/2-in.	25 1/2	7 1/2
4-in.	28 1/2	11 1/2
4 1/2-in. to 8-in.	27	10 1/2

Steel (butt, extra strong, plain ends)

1/4-in.	58 1/2	47 1/2
1/2-in.	62 1/2	51 1/2
1-in. to 3-in.	64	54

Wrought Iron (same as above)

1/4-in.	18 1/2	+1 1/2
1/2-in.	25 1/2	4 1/2
1-in. to 3-in.	33	13

Steel (lap, extra strong, plain ends)

2-in.	56	45 1/2
2 1/2-in. and 3-in.	60	49 1/2
3 1/2-in. to 6-in.	63 1/2	53

Wrought Iron (same as above)

2-in.	28 1/2	8 1/2
2 1/2-in. to 4-in.	34	16 1/2
4 1/2-in. to 6-in.	32 1/2	14 1/2

On butt-weld and lap-weld steel pipe jobbers are granted a discount of 5 pct. On l.c.l. shipments prices are determined by adding 25 pct and 30 pct and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or \$4 a ton higher than Pittsburgh or Lorain on lap-weld and one point lower discount, or \$2 a ton higher on all butt-weld.

BOILER TUBES

Seamless steel and lap-weld commercial boiler tubes and locomotive tubes, minimum wall. Net base prices per 100 ft f.o.b. Pittsburgh, in carload lots

	Seamless Cold-Drawn	Lap-weld, Hot-Rolled
2 in. O.D. 13 B.W.G.	16.52	13.90
2 1/4 in. O.D. 12 B.W.G.	22.21	18.70
2 in. O.D. 12 B.W.G.	24.71	20.79
2 1/4 in. O.D. 11 B.W.G.	31.18	26.25
4 in. O.D. 10 B.W.G.	38.68	32.56

(Extras for less carload quantities)

	Base
40,000 lb or ft and over	5 pct
30,000 lb or ft to 39,999 lb or ft.	10 pct
20,000 lb or ft to 29,999 lb or ft.	20 pct
10,000 lb or ft to 19,999 lb or ft.	30 pct
5,000 lb or ft to 9,999 lb or ft.	45 pct
2,000 lb or ft to 4,999 lb or ft.	65 pct

CAST IRON WATER PIPE

	Per net ton
6-in. to 24-in., del'd Chicago.	\$70.33
6-in. to 24-in., del'd New York.	69.60
6-in. to 24-in., Birmingham.	61.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles or Seattle for all rail shipment; rail and water shipment less	84.40
Class "A" and gas pipe, \$5 extra; 4-in. pipe is \$5 a ton above 6-in.	

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts

Add 18 pct for bolts up to 1/2 in. diam and 6 in. long. In larger sizes, add 15 pct.

Base discount less case lots

	Percent Off List
1/2 in. & smaller x 6 in. & shorter.	65 1/2
9/16 & 5/8 in. x 6 in. & shorter.	63 1/2
3/4 to 1 in. x 6 in. & shorter.	61
1 1/4 in. and larger, all lengths.	59
All diameters over 6 in. long.	59
Lag. all sizes.	62
Plow bolts.	65

Nuts, Cold Punched or Hot Pressed

(Hexagon or Square)

1/2 in. and smaller.	62
9/16 to 1 in. inclusive.	59
1 1/4 to 1 1/2 in. inclusive.	57
1 1/2 in. and larger.	56
On above bolts and nuts, excepting plow bolts, additional allowance of 10 pct for full container quantities. There is an additional 5 pct allowance for carload shipments.	

Semifin. Hexagon Nuts U.S.S. S.A.E.

Base discount less keg lots

7/16 in. and smaller.	64
1/2 in. and smaller.	62
1/2 in. through 1 in.	60
9/16 in. through 1 in.	59
1 1/4 in. through 1 1/2 in.	57
1 1/2 in. and larger.	56

In full keg lots, 10 pct additional discount. For 200 lb or more, freight allowed up to 50¢ per 100 lb, based on Cleveland, Chicago, Pittsburgh.

Stove Bolts

	Consumer
Packages, nuts loose.	71 and 10
In packages.	71
In bulk.	80
On stove bolts freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago, New York on lots of 200 lb or over.	

Large Rivets

(1/2 in. and larger)

	Base per 100 Lb
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.	\$4.75
F.o.b. Lebanon, Pa.	4.90

Small Rivets

(7/16 in. and smaller)

	Percent Off List
F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham.	55 and 5

Cap and Set Screws

	Percent Off List
(In packages)	
Upset full fin, hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points 71	
Milled studs.	46
Flat head cap screws, listed sizes.	36
Fillister head cap, listed sizes.	51
Freight allowed up to 65¢ per 100 lb based on Cleveland, Chicago or New York on lots of 200 lb or over.	

FLUORSPAR

Maximum price f.o.b. consumer's plant, \$30 per short ton plus either (1) rail freight from producer to consumer, or (2) rail freight from Rosiclare, Ill., to consumer, whichever is lower.

	Base price per short ton
Effective CaF ₂ Content: 70% or more.	\$33.00
65% but less than 70%.	32.00
60% but less than 65%.	31.00
Less than 60%.	30.00

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer.	\$5.45
Old range, non-bessemer.	5.30
Mesaba, bessemer.	6.20
Mesaba, non-bessemer.	6.05
High phosphorus.	6.05

Prices are for ore shipped on and after June 24, 1946, and for ore covered by adjustable pricing agreements authorized by Order No. 8, RMPR 113. These prices do not reflect the recent ICC increase in freight rates.

METAL POWDERS

Prices in cents per pound in ton lots, f.o.b. shipping point.

Brass, minus 100 mesh.	19 1/4¢ to 21 1/4¢
Copper, electrolytic, 100 and 375 mesh.	23 1/2¢ to 27 1/2¢
Copper, reduced, 150 and 200 mesh.	22 1/2¢
Iron, commercial, 100, 200, 325, mesh 96 + % Fe.	11¢ to 14¢
Swedish sponge iron, 100 mesh, c.l.f. N. Y., carlots, ocean bags.	7.4¢ to 8¢
Iron, crushed, 200 mesh and finer, 90 + % Fe carload lots.	4¢
Iron, hydrogen reduced, 300 mesh and finer, 98 + % Fe, drum lots.	63¢
Iron, electrolytic, unannealed, 325 mesh and coarser, 99 + % Fe. 25¢ to 31¢	
Iron, electrolytic, annealed minus 100 mesh, 99 + % Fe.	17¢
Iron carbonyl, 300 mesh and finer, 98-99.8 + % Fe.	\$1.71
Aluminum, 100, 200 mesh, carlots.	36¢
Antimony, 100 mesh.	36¢
Cadmium, 100 mesh.	\$1.71
Chromium, 100 mesh and finer.	\$1.31
Lead, 100, 200 & 300 mesh. 13 1/4¢ to 16 1/4¢	
Manganese, minus 325 mesh and coarser.	44¢ to 61¢
Nickel, 150 mesh.	61 1/4¢
Silicon, minus 325 mesh and coarser.	26¢ to 56¢
Solder powder, 100 mesh. 8 1/4¢ plus metal Tin, 100 mesh.	58 1/4¢
Tungsten metal powder, 98-99%, any quantity, per lb.	\$3.66
Molybdenum powder, 99%, in 100-lb kegs, f.o.b. York, Pa., per lb.	\$2.65
Under 100 lb.	\$3.90

COKE

	Net Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	\$8.75
Connellsville, Pa., hand drawn.	9.35
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	8.50

Foundry, Byproduct

Chicago, del'd.	15.10
Chicago, f.o.b.	14.35
New England, del'd.	16.04
Kearny, N. J., f.o.b.	14.40
Philadelphia, del'd.	14.63
Buffalo, del'd.	14.75
Portsmouth, Ohio, f.o.b.	12.85
Painesville, Ohio, f.o.b.	13.60
Erie, del'd.	14.50
Cleveland, del'd.	14.55
Cincinnati, del'd.	14.60
St. Louis, del'd.	15.10†
Birmingham, del'd.	12.85

†Except producers situated in states other than Missouri, Alabama or Tennessee, sellers may charge a maximum delivered price of \$15.60 in the St. Louis Mo., and East St. Louis, Ill., switching districts.

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Carloads Per 1000
Super-duty brick, St. Louis.	\$81.00
First quality, Pa., Md., Ky., Mo., Ill., Ohio.	65.00
First quality, New Jersey.	70.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	59.00
Sec. quality, New Jersey.	62.00
Sec. quality, Ohio.	57.00
Ground fire clay, net ton, bulk.	9.50

Silica Brick

Pennsylvania and Birmingham.	\$65.00
Chicago District.	74.00
Silica cement, net ton (Eastern).	11.50
Chicago.	12.50

Chrome Brick

	Per Net Ton
Standard chemically bonded, Balt., Plymouth Meeting, Chester.	\$54.00

Magnesite Brick

Standard, Balt. and Chester.	\$76.00
Chemically bonded, Baltimore.	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks.	\$44.50
Domestic, f.o.b. Chewelah, Wash., in bulk.	22.00
in sacks.	25.00
Clinker (dead burned) dolomite, bulk, per net ton, f.o.b. York, Pa.	10.05
Midwest, add 10¢; Mo. Valley, add 20¢	

PRICES

WAREHOUSE PRICES

Delivered metropolitan areas, per 100 lb.

Cities	SHEETS			STRIP			Plates ¾ in. and heavier	Structural Shapes	BARS		ALLOY BARS			
	Hot- Rolled (10 gage)	Cold- Rolled	Galvanized (24 gage)	Hot-Rolled		Cold- Rolled			Hot- Rolled A-8617-20	Cold- Finished	Hot- Rolled, A-8742-50 Ann.	Cold- Drawn, A-8617-20	Cold- Drawn A-8742-50 Ann.	
				6 in. and Under	Over 6 in.									
Philadelphia.....	\$3.774	\$5.139	\$5.249*	\$4.314	\$4.214	\$5.064	\$3.875	\$3.937	\$4.114	\$4.584	\$6.287	\$7.387	\$7.684	\$8.784
New York.....	3.856	4.869	5.501	4.375	4.275	5.075	4.049	4.038	4.134	4.584	6.338	7.438	7.884	8.784
Boston.....	4.05	5.031	5.725	4.618	4.418	4.985	4.203	4.023	4.356	4.656	6.503	7.603	7.768	8.856
Baltimore.....	3.64	5.118	5.385	4.293	4.193	.....	3.865	4.05	4.093	4.543	.....	.....	.....	.....
Norfolk.....	4.037	.....	5.882	4.577	4.477	.....	4.262	4.303	4.377	4.677	.....	.....	.....	.....
Chicago.....	3.475	4.425	5.40	3.95	3.85	4.90*	3.80	.....	3.75	4.20	6.05	7.15	7.20	8.30
Milwaukee.....	3.633	4.583	5.558	4.108	4.008	5.058*	3.958	3.958	3.908	4.358	6.308	7.408	7.458	8.558
Cleveland.....	3.575	.....	5.347	3.95	3.85	.....	3.65	3.88	3.60	4.20	6.277	7.377	7.20	8.30
Buffalo.....	3.575	4.625	5.20	4.211	4.111	4.961	3.921	3.65	3.60	4.20	6.05	7.15	7.20	8.30
Detroit.....	3.71	4.76	5.526	4.085	3.985	4.95	3.935	3.987	3.735	4.285	6.456	7.556	7.585	8.685
Cincinnati.....	3.671	4.721	5.296	4.046	3.946	5.002	3.952	3.983	3.902	4.502	6.441	7.541	7.602	8.702
St. Louis.....	3.643	4.593	5.622	4.118	4.018	5.222	3.968	3.968	3.918	4.522	6.472	7.572	7.622	8.722
Pittsburgh.....	3.575	4.625	5.20	3.95	3.85	4.70	3.65	3.65	3.60	4.20	6.05	7.15	7.20	8.30
St. Paul.....	3.817	4.767	5.666	4.292	4.192	5.000	4.142	4.142	4.092	4.592	6.322	7.422	7.952	8.052
Duluth.....	3.817	4.767	5.666	4.292	4.192	.....	4.142	4.142	4.092	4.592	6.472	6.572	.....	.....
Omaha.....	4.045	5.72	6.00	4.52	4.42	.....	4.37	4.37	4.32	4.949	.....	.....	.....	.....
Indianapolis.....	3.775	4.825	5.40	4.15	4.05	5.03	3.92	3.92	3.87	4.47	6.17	.....	7.32	.....
Birmingham.....	3.675	.....	5.20	4.05	3.95	.....	3.80	3.80	3.75	4.954	6.414	7.514	7.564	8.614
Memphis.....	4.221	.....	5.748	4.586	4.486	.....	4.346	4.346	4.296	4.821	.....	.....	.....	.....
New Orleans.....	4.359*	5.401	5.884	4.734	4.634	.....	4.484	4.484*	4.434*	5.175	.....	.....	.....	.....
Los Angeles.....	4.885	6.6351	6.585	5.335	5.235	.....	4.835	4.735	4.685	5.065	.....	.....	.....	.....
San Francisco.....	4.435	5.035	5.585	4.885	4.785	.....	4.535	4.385	4.435	5.015	.....	.....	.....	.....
Seattle.....	4.905*	7.305*	6.435	4.635	4.535	.....	5.035*	4.735*	4.635*	5.265	7.735*	8.735*	.....	9.585*
Portland.....	4.905*	.....	6.235	5.135	.....	.....	5.035*	4.735*	4.635*	5.015	7.735	8.985	.....	.....
Salt Lake City.....	4.81	.....	6.70	5.94	5.84	.....	5.29	5.29	5.19	6.49	.....	.....	.....	.....

BASE QUANTITIES

Standard unless otherwise keyed on prices.

HOT-ROLLED: Sheets, strip, plates, shapes and bars, 400 to 1999 lb.

COLD-ROLLED: Sheets, 400 to 1999 lb; strip, extras on all quantities; bars, 1500 lb base.

ALLOY BARS: 1000 to 39,999 lb.

GALVANIZED SHEETS: 450 to 1499 lb.

EXCEPTIONS: (1) 400 to 1499 lb; (2) 450 to 1499 lb; (3) 450 to 3749 lb; (4) 300 to 4999 lb; (5) 300 to 10,000 lb; (6) 2000 lb and over; (7) 3500 lb and over; (8) 1000 lb and over.

(*) Philadelphia: Galvanized sheet, 25 or more bundles.

Extra for size, quality, etc., apply on above quotations.

* Add 29.1¢ for sizes not rolled in Birmingham.

** City of Philadelphia only. Applicable freight rates must be added to basing point prices to obtain delivered price to other localities in metropolitan area.

PIG IRON PRICES

Per gross ton.

BASING POINT PRICES						DELIVERED PRICES (BASE GRADES)							
Basing Point	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.	Consuming Point	Basing Point	Freight Rate	Basic	No. 2 Foundry	Malleable	Bessemer	Low Phos.
Bethlehem.....	29.00	29.50	30.00	30.50	36.00	Boston.....	Everett.....	\$0.50 Arb.	29.50	30.00	30.50	31.00	38.47
Birdsboro.....	31.00	31.50	32.00	32.50	36.00	Boston.....	Birdsboro-Steelton...	4.47	.....	.....	.....	.....	38.47
Birmingham.....	23.50*	24.88*	.....	29.50	.....	Brooklyn.....	Bethlehem.....	2.78	31.78	32.28	32.78	33.28	.....
Buffalo.....	27.50	28.50	29.00	29.50	34.00	Brooklyn.....	Birdsboro.....	3.26	.....	.....	.....	.....	37.26
Chicago.....	28.00	28.50	28.50	29.00	.....	Canton.....	Clev. Ygstin, Sharpsvill.	1.84	29.54	30.04	30.04	30.54	.....
Cleveland.....	28.00	28.50	28.50	29.00	.....	Canton.....	Buffalo.....	3.55	.....	.....	.....	.....	37.55
Detroit.....	28.00	28.50	28.50	29.00	.....	Cincinnati.....	Birmingham.....	4.30	27.80*	29.18*	.....	.....	.....
Duluth.....	28.50	29.00	29.00	29.50	.....	Cincinnati.....	Hamilton.....	1.24	.....	.....	29.74	.....	.....
Erie.....	28.00	28.50	29.00	29.50	.....	Cincinnati.....	Buffalo.....	4.89	.....	.....	.....	.....	38.89
Everett.....	29.00	29.50	30.00	30.50	.....	Jersey City.....	Bethlehem.....	1.70	30.70	31.20	31.70	32.20	.....
Granite City.....	28.00	28.50	28.50	29.00	.....	Jersey City.....	Birdsboro.....	2.18	.....	.....	.....	.....	36.18
Hamilton.....	28.00	28.50	28.50	29.00	.....	Los Angeles.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
Naville Island.....	30.00	30.50	30.50	31.00	.....	Los Angeles.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
Provo.....	28.00	28.50	.....	29.00	.....	Mansfield.....	Cleveland-Toledo.....	2.16	30.16	30.66	30.66	31.16	.....
Sharpsville.....	28.00	28.50	28.50	29.00	.....	Mansfield.....	Buffalo.....	3.74	.....	.....	.....	.....	37.74
Sparrows Point.....	29.00	29.50	.....	.....	.....	Philadelphia.....	Swedeland.....	0.93	29.93	30.43	30.93	31.43	.....
Steelton.....	29.00	.....	.....	.....	34.00	Philadelphia.....	Birdsboro.....	1.38	.....	.....	.....	.....	35.38
Swedeland.....	29.00	29.50	30.00	30.50	.....	San Francisco.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
Toledo.....	28.00	28.50	28.50	29.00	.....	San Francisco.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
Youngstown.....	28.00	28.50	28.50	29.00	.....	Seattle.....	Provo.....	5.25	31.25	31.75	.....	.....	.....
						Seattle.....	Buffalo.....	16.33	.....	.....	.....	.....	50.33
						St. Louis.....	Granite City.....	0.50 Arb.	28.50	29.00	29.00	29.50	.....
						St. Louis.....	Buffalo.....	7.86	.....	.....	.....	.....	41.86

* Republic Steel Corp. charges \$2 more on basic and foundry pig iron produced at Birmingham.

† Pig iron produced at Birdsboro, Pa., add \$2.00.

(1) Struthers Iron & Steel Co., Struthers, Ohio, charges 50¢ per ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Charcoal pig iron base prices for Lyles, Tenn., and Lake Superior furnaces, \$33.00 and \$34.00, respectively. Newberry Brand of Lake Superior charcoal iron \$39.00 per g.t., f.o.b. furnace. Delivered to Chicago, \$42.34.

High phosphorus iron sells at Lyles, Tenn., at \$28.50.

Basing point prices are subject to switching charges; silicon differentials (not to exceed 50¢ per ton for each 0.25 pct silicon content in excess of base grade which is 1.75 to 2.25 pct); phosphorus differentials, a reduction of 38¢ per ton for phosphorus content of 0.70 pct and over; manganese differentials, a charge not to exceed 50¢ per ton for each

0.50 pct manganese content in excess of 1.00 pct. \$2 per ton extra may be charged for 0.8 to 0.75 pct nickel content and \$1 per ton extra for each additional 0.25 pct nickel.

Silvery iron, silicon 6.00 to 6.50 pct, C/L per g.t., f.o.b. Jackson, Ohio—\$49.00; f.o.b. Buffalo—\$49.25. Add \$1.00 per ton for each additional 0.50 pct Si. Add 50¢ per ton for each 0.50 pct Mn over 1.00 pct. Add \$1.00 per ton for prices of comparable analysis.

FERROALLOY PRICES

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size, f.o.b. Baltimore, Philadelphia, New York, Birmingham, Rockdale, Rockwood, Tenn.
 Carload lots (bulk) \$135.00
 Less ton lots (packed) 148.50
 F.o.b. Pittsburgh 139.50
 \$1.70 for each 1% above 82% Mn; penalty, \$1.70 for each 1% below 78%.
 Briquets—cents per pound of briquet, freight allowed, 66% contained Mn.
 Eastern Central Western
 Carload, bulk 6.05 6.30 6.60
 Ton lots 6.65 7.55 8.55
 Less ton lots 6.80 7.80 8.80

Spiegeleisen

Contract prices, gross ton, lump, f.o.b. Palmerton, Pa.
 16-19% Mn 19-21% Mn
 3% max. Si 3% max. Si
 Carloads \$39.00 \$40.00
 F.o.b. Pittsburgh, Chicago 40.00

Manganese Metal

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed, eastern zone.
 96% min. Mn, 0.2% max. C, 1% max. Si, 2% max. Fe.
 Carload, bulk 30
 L.c.l. lots 32

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.
 Carloads 32
 Ton lots 34
 Less ton lots 36

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, f.o.b. shipping point, freight allowed, eastern zone.
 Carloads Ton Less
 0.10% max. C, 0.06% P, 90% Mn 21.00 21.40 21.65
 0.10% max. C 20.50 20.90 21.15
 0.15% max. C 20.00 20.40 20.65
 0.30% max. C 19.50 19.90 20.15
 0.50% max. C 19.00 19.40 19.65
 0.75% max. C 18.50 18.90 19.15
 7.00% max. Si 16.00 16.40 16.65

Silicomanganese

Contract basis, lump size, cents per pound of metal, f.o.b. shipping point, freight allowed. 65-70% Mn, 17-20% Si, 1.5% max. C.
 Carload, bulk 6.05
 Ton lots 6.70
 Briquet, contract basis, carlots, bulk freight allowed, per lb of briquet. 5.80
 Ton lots 6.30
 Less ton lots 6.55

Silvery Iron (electric furnace)

Si 14.01 to 14.50%, \$53.25 f.o.b. Keokuk, Iowa; \$50.00 f.o.b. Jackson, Ohio; \$51.25 f.o.b. Niagara Falls. Add \$1.00 per ton for each additional 0.50% Si up to and including 18%. Add \$1.00 per ton for low impurities, not to exceed: P—0.05%, S—0.04%, C—1.00%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, f.o.b. shipping point, freight allowed, for ton lots, packed.
 Eastern Central Western
 96% Si, 2% Fe. 13.10 13.55 16.50
 97% Si, 1% Fe. 13.45 13.90 16.80

Ferrosilicon Briquets

Contract price, cents per pound of briquet, bulk, f.o.b. shipping point, freight allowed to destination, 40% Si.
 Eastern Central Western
 Carload, bulk 3.60 3.75 3.90
 Ton lots 4.15 4.55 4.60
 Less ton lots 4.40 4.80 4.85

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump size in carloads, f.o.b. shipping point, freight allowed.
 Eastern Central Western
 50% Si 7.05 7.50 7.65
 75% Si 8.55 8.70 9.25
 80-90% Si 9.50 9.65 10.15
 90-95% Si 11.80 11.95 12.40

Ferrochrome

(65-72% Cr, 2% max. Si)
 Contract prices, cents per pound, contained Cr, lump size in carloads, f.o.b. shipping point, freight allowed.
 Eastern Central Western
 0.06% C 23.00 23.40 24.00
 0.10% C 22.50 22.90 23.50
 0.15% C 22.00 22.40 23.00
 0.20% C 21.50 21.90 22.50
 0.50% C 21.00 21.40 22.00
 1.00% C 20.50 20.90 21.50
 2.00% C 19.50 19.90 20.50
 66-71% Cr, 4-10% C 14.50 14.90 15.00
 62-66% Cr, 5-7% C 15.05 15.45 15.55
 Briquets—contract price, cents per pound of briquet, f.o.b. shipping point, freight allowed, 60% chromium.
 Eastern Central Western
 Carload, bulk 9.20 9.50 9.90
 Ton lots 9.80 10.30 11.80
 Less ton lots 10.10 10.60 12.10

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 2¢ per lb to regular low-carbon ferrochrome price schedule. Add 2¢ for each additional 0.25% N. High-carbon type: 66.71% Cr, 4-5% C, 0.75% N. Add 5¢ per lb to regular high-carbon ferrochrome price schedule.

S. M. Ferrochrome

Contract price, cents per pound chromium contained, lump size, f.o.b. shipping point, freight allowed.
 High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.
 Eastern Central Western
 Carload 15.60 16.00 16.10
 Ton lots 16.65 17.30 18.50
 Less ton lots 17.30 17.95 19.15
 Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% max. C.
 Eastern Central Western
 Carload 20.00 20.40 21.00
 Ton lots 21.00 21.65 22.85
 Less ton lots 22.00 22.65 23.85

Chromium Metal

Contract prices, cents per lb, chromium contained, carload, f.o.b. shipping point, freight allowed. 97% min. Cr, 1% max. Fe.
 Eastern Central Western
 0.20% max. C 83.50 85.00 86.25
 0.50% max. C 79.50 81.00 82.25
 9.00% min. C 79.50 81.00 82.25

Chromium-Copper

Contract price, cents per pound of alloy, f.o.b. Niagara Falls, freight allowed east of the Mississippi. 8-11% Cr, 88-90% Cu, 1.00% max. Fe, 0.50% max. Si.
 Shot or ingot 45¢

Calcium-Silicon

Contract price per lb of alloy, lump, f.o.b. shipping point, freight allowed.
 30-35% Ca, 60-65% Si, 3.00% max. Fe or 28-32% Ca, 60-65% Si, 6.00% max. Fe.
 Eastern Central Western
 Carloads 13.00 13.50 15.55
 Ton lots 14.50 15.25 17.40
 Less ton lots 15.50 16.25 18.40

Calcium-Manganese-Silicon

Contract prices, cents per lb of alloy, lump, f.o.b. shipping point, freight allowed.
 16-20% Ca, 14-18% Mn, 53-59% Si.
 Eastern Central Western
 Carloads 15.50 16.00 18.05
 Ton lots 16.50 17.35 19.10
 Less ton lots 17.00 17.85 19.60

Calcium Metal

Eastern zone contract prices, cents per pound of metal, f.o.b. shipping point, freight allowed. Add 1¢ for central zone; 5¢ for western zone.
 Cast Turnings Distilled
 Ton lots 1.35 1.75 4.25
 Less ton lots 1.60 2.00 5.00

CMSZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.
 Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.
 Eastern Central Western
 Ton lots 12.00 12.75 14.75
 Less ton lots 12.50 13.25 15.25
 Alloy 5: 50-56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.
 Ton lots 11.75 12.50 14.50
 Less ton lots 12.25 13.00 15.00

SMZ

Contract price, cents per pound of alloy, f.o.b. shipping point, freight allowed.
 60-65% Si, 6-7% Mn, 5-7% Zr, 20% Fe.
 Eastern Central Western
 Ton lots 12.00 12.85 14.60
 Less ton lots 12.50 13.35 15.10

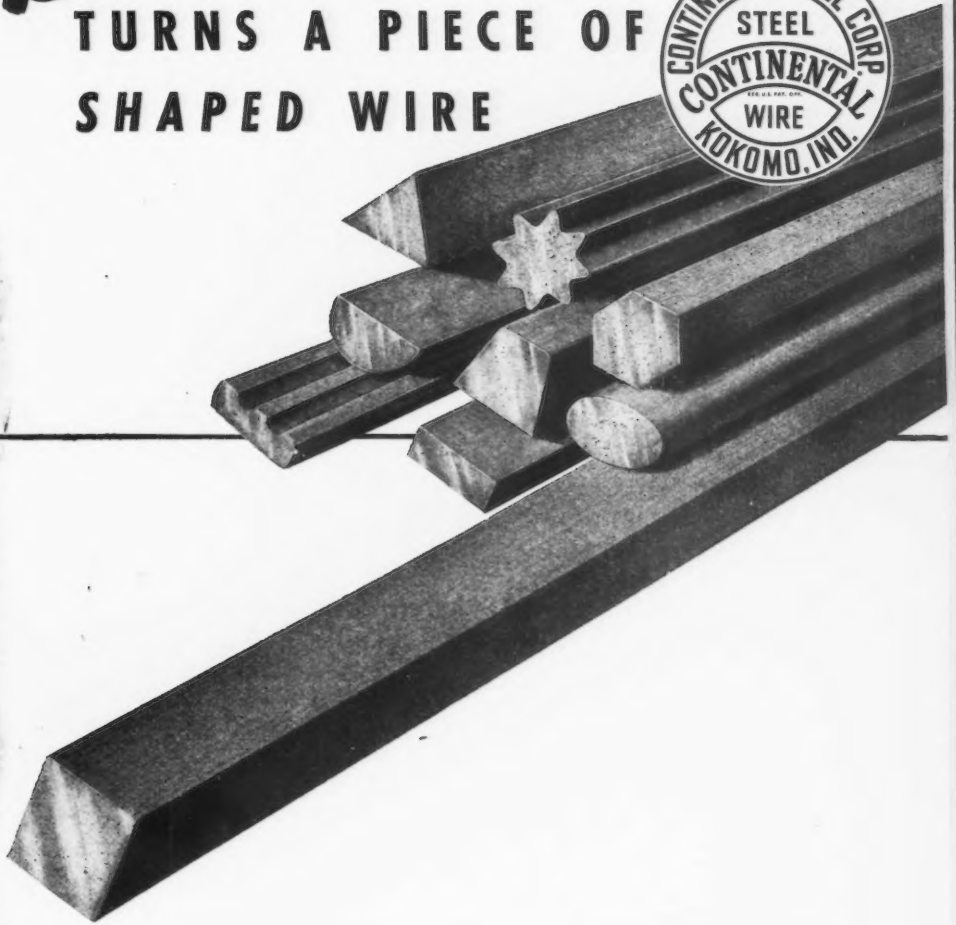
Other Ferroalloys

Ferrotungsten, standard, lump or ¼X down, packed, f.o.b. plant
 Niagara Falls, Washington, Pa., York, Pa., per pound contained T, 5 ton lots, freight allowed. \$1.20
 Ferrovandium, 35-55%, contract basis, f.o.b. plant, freight allowances, per pound contained V. \$2.70
 Openhearth \$2.70
 Crucible \$2.70
 High speed steel (Primos) \$2.70
 Vanadium pentoxide, 88-92% V₂O₅, technical grade, contract basis, per pound contained V₂O₅. \$1.10
 Ferrocolumbium, 50-60%, contract basis, f.o.b. plant, freight allowed, per pound contained Cb. \$2.10
 Ton lots \$2.10
 Less ton lots \$2.10
 Ferromolybdenum, 55-75%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo 90¢
 Calcium molybdate, 40-45%, f.o.b. Langeloth, Washington, Pa., per pound contained Mo 80¢
 Molybdenum oxide briquets, 48-52% Mo, f.o.b. Langeloth, Pa., per pound contained Mo 80¢
 Molybdenum oxide, in cans, f.o.b. Langeloth and Washington, Pa., per pound contained Mo 80¢
 Ferrotitanium, 40-45%, 0.10% C max., f.o.b. Niagara Falls, N. Y., ton lots, per pound contained Ti. \$1.10
 Less ton lots \$1.10
 Ferrotitanium, 20-25%, 0.10% C max., ton lots, per pound contained Ti \$1.10
 Less ton lots \$1.10
 High-carbon ferrotitanium, 15-20%, 6-8% C, contract basis, f.o.b. Niagara Falls, freight allowed, carloads \$142.50
 Ferrophosphorus, 18%, electric or blast furnaces, f.o.b. Anniston, Ala., carlots, with \$3 unitage freight equalized with Rockdale, Tenn., per gross ton \$58.50
 Ferrophosphorus, Electrolytic, 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., \$3 unitage freight equalized with Nashville, per gross ton \$75.90
 Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy. 140
 Carload lots 140
 Zirconium, 12-15%, contract basis, lump, f.o.b. plant, freight allowed, per pound of alloy. 4.000
 Carload, bulk 4.000
 Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Niagara Falls, carload 6.250
 Ton lots 6.750
 Silmanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound Car lots 8.500
 Ton lots 9.250
 Less ton lots 9.750

Boron Agents
 Contract prices per pound of alloy, f.o.b. shipping point, freight allowed.
 Ferroboreon, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C.
 Eastern Central Western
 Less ton lots \$1.30 \$1.3075 \$1.325
Manganese-Boron 75.00% Mn, 15-20% B 5% max. Fe, 1.50% max. Si, 3.00% max. C.
 Ton lots \$1.89 \$1.903 \$1.938
 Less ton lots 2.01 2.023 2.058
Nickel-Boron 15-18% B, 1.00% max. Al 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni.
 Less ton lots \$2.10 \$2.1125 \$2.1440
 Silcaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy. 250
 Carload lots 250
 Ton lots 250
 Silvaz No. 3, contract basis, f.o.b. plant, freight allowed, per pound of alloy. 580
 Carload lots 580
 Ton lots 580
 Grainal, f.o.b. Bridgeville, Pa., freight allowed, 50 lb and over. 87.50
 No. 1 600
 No. 6 450
 No. 79 450
 Borram, f.o.b. Niagara Falls
 Ton lots, per pound 450
 Less ton lots, per pound 600

The Hand on the Doorknob...

URNS A PIECE OF
SHAPED WIRE



The use of wire drawn to special shapes is a fast-growing industrial practice. More and more manufacturers are learning how Continental shaped wire made to fit a particular application can cut costs and improve their products.

Continental wire is made in standard and special shapes in a great variety of sizes, tempers, and finishes. There is a Continental wire to enhance the "sales appeal" of the items you manufacture. Your products may have one or more parts that can be "shape-engineered" from wire to do their job better and more economically. Write today for a copy of Continental's handy booklet with helpful wire information for manufacturers.



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STEEL**

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STEEL CORPORATION**

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PRODUCERS OF Manufacturer's Wire in many sizes,
temper and finishes including Galvanized

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Quality WRENCHES

These fine wrenches combine balance with great strength. Accurate openings assure a positive grip on screw head or nut. Engineered designs give increased leverage and applied power. The finest wrench steels, drop forged, heat treated, tempered and tested, give extra strength . . . superior "tool sense" has created a line of superior wrenches.

ARMSTRONG Wrenches are catalogued, stocked and sold by leading distributors everywhere.

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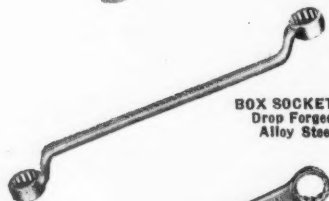
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OPEN END
Drop Forged
Carbon Steel



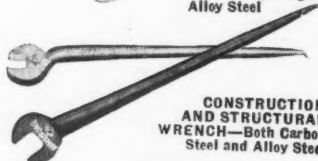
OPEN END
Drop Forged
Alloy Steel



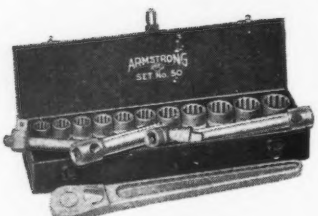
BOX SOCKET
Drop Forged
Alloy Steel



COMBINATION
WRENCHES
Open End and Box
Socket Drop Forged,
Alloy Steel



CONSTRUCTION
AND STRUCTURAL
WRENCH—Both Carbon
Steel and Alloy Steel



DETACHABLE SOCKET SETS
Drop Forged Ratchets
Alloy Sockets

NEWS OF INDUSTRY

Reports Italo-Austrian Steel Industries Have Reached Understanding

Milan

• • • Confirming previous reports regarding the possibility of an understanding between the Austrian steel industry and the Italian steel industry, it is understood that an agreement has been reached between the Alpine Montan Gesellschaft and the Cantieri Riuniti dell'Adriatico at Monfalcone in connection with the supply of shipbuilding steel plates valued at \$1,000,000.

In the future the Alpine Montan Gesellschaft is to send semifinished steel and iron materials to the Bolzano steelworks where they are to be rolled for the Italian market. In connection with the demand for iron and steel materials, it is confirmed that both Russia and Turkey are to supply the necessary steel plating for the vessels which these two countries have ordered to the Italian shipbuilding industry.

It is understood that a further development is expected from the conclusion of the Italo-Hungarian trade agreement to be signed this month which should lead to the import into Italy of steel not only for the automobile and locomotive building industries, but also of forgings for the machine tool and shipbuilding industries.

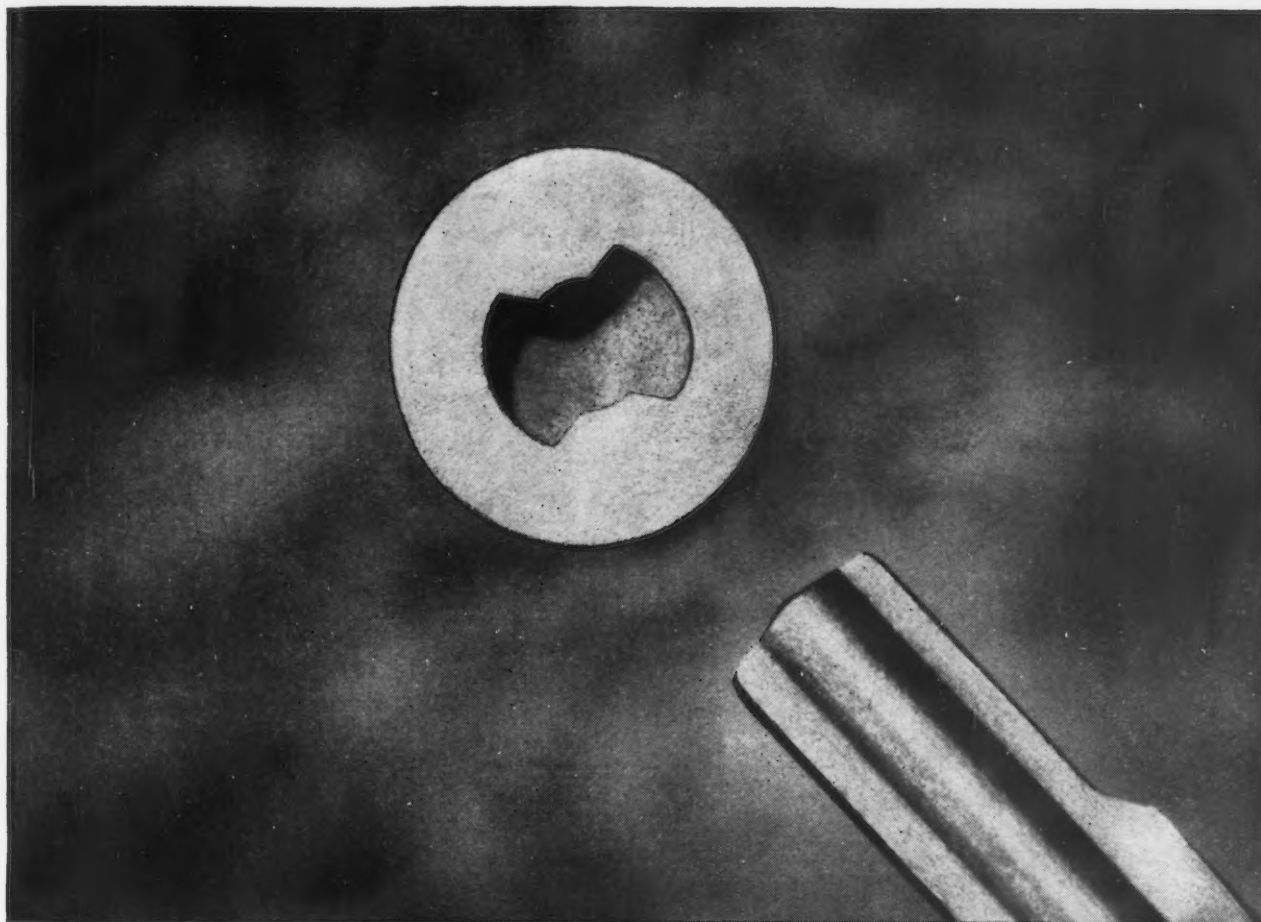
On the other hand, in connection with the negotiations to be developed at Treviso between Italy and Switzerland to have the Italian industries working for account of the Swiss engineering industry, it is believed that such work is going to be paid with the supply of steel materials instead of with gold currency.

Industrialists Obtain Edgar E. Brosius Co.

Pittsburgh

• • • Leonard W. Bughman has been elected president of the Edgar E. Brosius Co. Inc., Sharpsburg, Pa., which has been purchased from Edgar Brosius by a group of industrialists. Mr. Brosius, who will remain as chairman of the board of the new corporation, organized the company in 1922.

Tom Girdler, chairman of the



TYPE "A"
ASSEMBLY BIT

COMMON
SCREWDRIVER

TIME FOR A POST-MORTEM ON COSTS?

Let Clutch Head Users Furnish the Answers

Comparing CLUTCH HEADS with other recessed head and slotted head screws, they testify they have found:

Higher Visibility Cuts Cost 3 Ways . . . saving "break-in" period for new operators; substituting sureness for hesitation; inspiring higher speed born of confidence.

Chewed-Up Heads Eliminated by dead-center entry with the Center Pivot column, preventing driver canting and making straight driving automatic.

Slippage Hazard Reduced to Zero by CLUTCH HEAD's all-square driving engagement and absence of "ride-out" as set up by tapered driving with other type screws.

A Fatigue Factor Disposed Of because non-tapered driving lets the screw ride home without the application of exhausting end pressure to combat "kick-out."

Up to 214,000 Screws Driven continuously and without interruption for reconditioning by the Type "A" Bit . . . tool economy they describe as "unheard of."

The Lock-On Surmounts Hurdles of inside reaching by uniting screw and bit as a unit . . . in assembling and also in "un-buttoning" the job in the field.

Like to check these features? . . . then send for screw assortment and sample Type "A" Bit

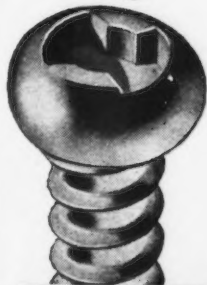
Screwdriver Operation

for emergency adjustments checks out "headaches" in field service . . . that any flat blade reasonably accurate in width will do, thickness being a secondary consideration.



60-Second Bit Reconditioning

saves time and money . . . a brief application of the end surface to a grinding wheel sufficing to restore this Type "A" Bit to original efficiency, time and time again.



UNITED SCREW AND BOLT CORPORATION

CLEVELAND 2

CHICAGO 8

NEW YORK 7

FREE -TO GEAR BUYERS



FREE THIS HANDY GEAR TOOTH CALCULATOR

The numbers on the outer edge of this device represent the diametral pitch of the gear. By turning the cut-out section to the desired number, the figures appearing in the space show circular pitch, circular thickness, addendum and the whole depth. • These calculators are available to gear buyers upon request—with our compliments.

YOU FURNISH THE SPECIFICATIONS • WE'LL PRODUCE THE GEARS

**PERKINS Precision, Custom-Cut
PERKINS MACHINE & GEAR CO., Springfield 2, Mass. GEARS**

NEWS OF INDUSTRY

board, Republic Steel Corp., will serve as member of the board of directors. Ward Wickwire, Buffalo, and Mr. Bughman are also members of the board.

Mr. Bughman, formerly associated with the Mellon Bank, Pittsburgh, said the company, which makes specialties for blast furnaces and steel mills, will be expanded.

Steel Window Program For Vet Housing Lags Due to Steel Shortage

Washington

••• The Steel Window Industry Advisory Committee told the CPA at a recent meeting that manufacturers will not be able to supply enough steel windows for new veterans' housing during 1947 unless they receive more steel sections from rolling mills. A spokesman for NHA said that steel window producers will be expected to make between 4 and 6 million of the approximately 16 million above-ground windows which NHA estimates will be needed in the Veterans' Emergency Housing Program next year.

CPA urged manufacturers to increase their present output of 130,000 windows a month, and offered assistance in getting materials. CPA mentioned the possibility of financial help through RFC, and labor aid from USES.

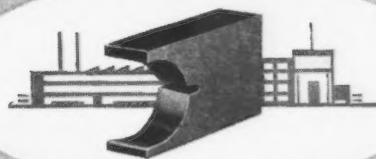
Window makers, however, said that many plants are working at one-quarter of their capacity, one shift for three days a week, because of the hand-to-mouth steel supply, and insisted that no improvements can be expected unless their steel deliveries are increased. CPA said it was considering calling in representatives of the steel companies to ask their help in channeling more steel to the window program.

Industry spokesmen added that in order to increase production substantially they also will have to have help in getting new machinery, jigs, hardware, nuts, bolts, washers, and rivets.

Industry spokesmen said that, given the necessary steel, they could manufacture all the windows required by VEHP. They were on record to oppose possible RFC financing of new steel window manufacturers until present capacities are utilized more fully.

In Electric Motor Manufacture

Carboloy* work-supports make possible greater concentricity of commutators and quieter motors.



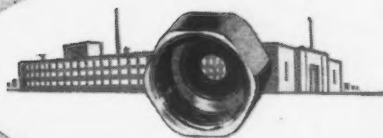
In Container Making

Carboloy* solved a problem of costly maintenance, by outlasting steel 35 to 1.



In a Farm Equipment Plant

Carboloy* showed the way to make spray discs last the life of the sprayer.



In the Sporting Goods Field

Carboloy* solved a troublesome line-guide problem (applicable to guide-wear problems in the textile field, carpet manufacture, etc.).



... And in hundreds of other applications, they're solving their product problems with

Carboloy*, the versatile metal

IT PAYS . . . to investigate Carboloy* Hard Metal, no matter how remote your product may seem from the realm of this versatile powdered metal. For Carboloy* Hard Metal is entering new fields every day. It is literally "working wonders" in such widely-differing fields as the manufacture of:

Spark Plugs—Flashlight Batteries—Buttons—
Hoists—Pens and Pencils—Cigars

... to name just a few. Tough jobs are being done easier and faster. Maintenance cost is being cut down. Parts life is being boosted as high as 35 times. Production increases up to 100 times are being recorded!

Carboloy* Hard Metal may similarly solve your problem. Write us today, briefly describing the application, and we will promptly send our recommendations.

Put this "Versatile Metal" To Work For You—
6 Useful Properties Combined in One Metal.

High Red Hardness • Extreme Density •
High Abrasion Resistance • High Modulus of
Elasticity • High Compressive Strength • Low
Coefficient of Expansion and Contraction.

CARBOLOY*
(TRADEMARK) CEMENTED CARBIDE
HARD METAL

CARBOLOY COMPANY, Inc., 11111 E. 8 Mile Road

Detroit 32, Michigan

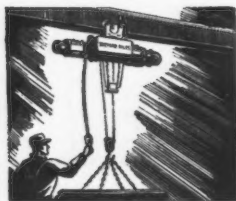
CHICAGO • CLEVELAND • DETROIT • HOUSTON • LOS ANGELES • MILWAUKEE
NEWARK • PHILADELPHIA • PITTSBURGH • THOMASTON



BUILT FOR TOUGH JOBS!

- The invisible strength of this mighty giant lifts and places heavy loads at your command.

The rugged construction of Shepard Niles Single Beam Cranes assures added handling economy resulting in extra value in terms of production economy. Shepard Niles Cranes are made tough and durable to give long, dependable service. They are made in many types, capacities and spans to fit your particular need.



To meet competitive production schedules—to maintain smooth-flowing production lines, material handling equipment must stand up under severe operating conditions. You'll get capacity load-handling, long efficient service at low maintenance cost with a Shepard Niles Hoist.

Shepard Niles
CRANE & HOIST CORPORATION

Improve your competitive position in the industrial world. A request will bring you full data and tell you how you can put a Shepard Niles Crane to efficient use in your factory.

NEWS OF INDUSTRY

October Bookings For Electric Trucks Climb

Chicago

• • • Domestic bookings for electric industrial trucks and tractors during the month of October 1946 totaled 267 units according to figures released by the Electric Industrial Truck Assn., Chicago.

The net value of chasses only booked during October totaled \$1,219,469 compared with \$920,367 in September 1946.

The October bookings included 2 platform trucks with capacities of 1000 to 6000 lb and chasses base prices ranging from \$1325 to \$2445 had a total net value of \$3770; 228 cantilever trucks with capacities and chasses base prices ranging from 1000 to 30,000 lb and \$1500 to \$20,065, respectively, had a total net value of \$1,035,369; 11 light and heavy duty tractors with chasses base prices ranging from \$1414 to \$1875 had a total net value of \$18,635; 13 crane trucks with capacities and chasses base prices ranging from 3000 to 10,000 lb and \$5480 to \$9500, respectively, had a total net value of \$96,170; 13 special trucks with capacities and chasses base prices ranging from 2000 to 6000 lb and \$3500 to \$5500 had a total net value of \$65,525, respectively.

All net values are at factories after additions and deductions for variation from standard specifications, trade in allowances, etc., when applicable.

Metal Institute Elects

New York

• • • L. A. Lindberg, president of the Lindberg Steel Treating Co., Chicago, was elected as new president of the Metal Treating Institute at its annual meeting held in the Traymore Hotel, Atlantic City, on November 14-17.

Other officers elected were: R. G. Sault, vice-president, R. W. Thorne, treasurer, Stewart N. Clarkson, executive secretary, and J. R. MacAllister, assistant secretary.

At the meeting, which was attended by representatives of over 50 companies, Mr. Lindberg set forth his plans for the coming year. Some of the features included were, publication of a book entitled "Manual for Heat Treating Services," to aid the buyer of heat-treating services.

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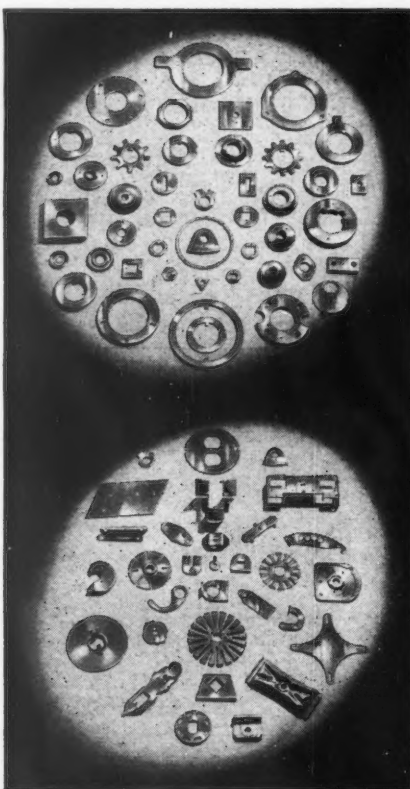
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150—THE IRON AGE, December 5, 1946

Wartime Applications Of Nickel and Alloys Continue Expanded Use

New York

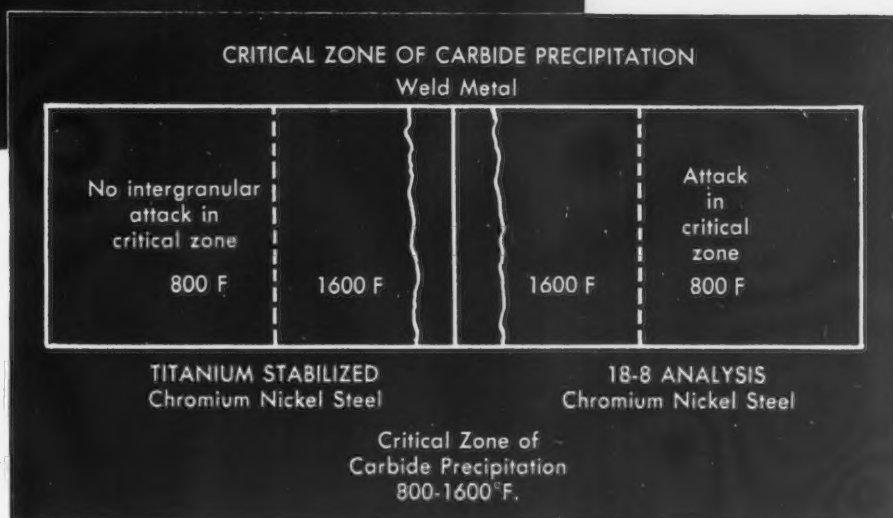
•••The standard triple alloy steels containing nickel, chromium and molybdenum accounted for an exceptionally large tonnage during the war and they are still employed in large quantities by users, it has been reported by the International Nickel Co. Inc. Of particular significance is the triple alloy steel tubing of the 8630 type which finds use in the aircraft industry because of its strength, ease of forming and ready weldability. Another development is the application of 8650 steel for heavy duty springs. Hardenability, toughness and improved surface qualities of this steel have led to its growing use.

There also has been a return to the use of standard alloy steels. Of the carburizing types, the 4600 series appears to be growing in demand, not only because of the properties developed, but because distortion as a result of heat treatment is minimized. For heavy duty carburized parts, the 4300 and 3300 steels are generally employed. In direct hardening grades, the 3100, 4600, 8600 and 2300 steels enjoy popularity, with the nickel-chromium-molybdenum 4340 steel widely used for stressed parts of heavy cross-section.

The low-alloy high-strength steels are receiving increased attention from designers because of the savings in weight realized from their mechanical properties. These steels respond well to cold-forming and welding.

It is estimated in trade circles that 1946 production of stainless steels will exceed or equal that of 1945. The chromium-nickel types are said to comprise more than two-thirds of the total.

AISI 302 and 304, containing about 8 pct nickel, are well suited to assembly by welding but type 304, because of its low carbon content, is better suited for welding without subsequent heat treatment. Stainless steel containing molybdenum (type 316), with its ability to withstand certain specific corrosion conditions, finds use in chemical, paper and related industries. Stainless steels, because of their strength and form-



HOW

Titanium Prevents Intergranular Corrosion in Welding Stainless

In the welding of austenitic stainless steels, the retention of carbides in solution is not possible because the resulting heating between 800 and 1600°F. precipitates the carbon present as chromium carbides in an intergranular pattern. In this condition the zones near the welds are predisposed to intergranular corrosion in certain media.

Titanium, the stabilizing element, prevents precipitation of chromium carbide in an intergranular pattern by virtue of the fact that it has greater affinity for carbon than any other element has for carbon, and accordingly, the carbides of titanium are uniformly dispersed thereby preventing intergranular precipitation and corresponding intergranular corrosion.



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NEWS OF INDUSTRY

ability, in addition to their resistance to corrosion by weather, continues to be used in the transportation industry for trains, trailers and other conveyances.

The need for materials to withstand the exceptionally high temperature of jet and gas turbine engines has given great impetus to the development of so-called "super-alloys" for high temperature service, and as the demand for such engines increases, a considerable market for these materials may be anticipated.

The high strength gray cast irons containing 1½ pct to 5 pct nickel, which are being used in diesel engine crankshafts and cylinder liners, and for aircraft piston rings. Strengths up to 100,000 psi are being obtained.

High duty cast irons contain up to 38 pct nickel. A low expansion type of cast iron containing from 36 pct to 38 pct nickel is an important component in precision machine tools. The abrasion-resisting martensitic cast irons containing 4½ pct nickel are in use in steel mills, and in the mining, cement, ceramic, power, paint and foundry industries.

A new copper-nickel-aluminum bronze containing 12 pct nickel, 0.6 pct iron, 1.0 pct manganese and 1.5 pct aluminum combines superior resistance to salt water corrosion and excellent mechanical properties, including 85,000 to 95,000 psi tensile strength. It is expected to find use in marine hardware and ship propellers where strength and sea water corrosion resistance are required.

There has been an expansion in the peacetime use of iron-nickel alloys possessing specialized thermal expansion properties as a result of more general use of automatic controls in electrically operated and temperature controlled products. The thermostatic bimetals ordinarily used to actuate these devices employ alloys containing 36 pct to 42 pct nickel for the low expansion side and a variety of alloy types containing 20 pct to 70 pct nickel for the high expansion side.

A marked increase also has occurred in the use of glass sealing alloys with 29 pct to 49 pct nickel for the manufacture of vacuum tubes, high wattage lamps, sealed beam headlights, etc. The unique



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magnetic characteristics shown by alloys of the group containing 47 pct to 84 pct nickel have become particularly important with the increasing use of higher frequency power applications in the electrical industry.

Nickel plating developments in the use of high speed plating baths permit the deposition of metal at higher current densities and have increased production capacities of shops with limited tank sizes and floor space. Bright nickel processes are being augmented by "semi-bright" deposits of good buffing qualities to reduce polishing and buffing costs.

The automotive industry, largest consumer of nickel for plating purposes, is employing heavier thicknesses of the metal to provide a more lasting and durable finish.

Units of intricate design are electroformed from nickel deposited at high speeds. Nickel plating to build up undersized dimensions resulting from over-machined or worn surfaces has proved profitable enough to prompt several concerns to provide this service. Electrodeposited nickel coatings on plastic and aluminum combine the advantages of the base materials and the nickel surface. Heavy nickel plate offers corrosion resistant surfaces for processing equipment in the food and chemical industries.

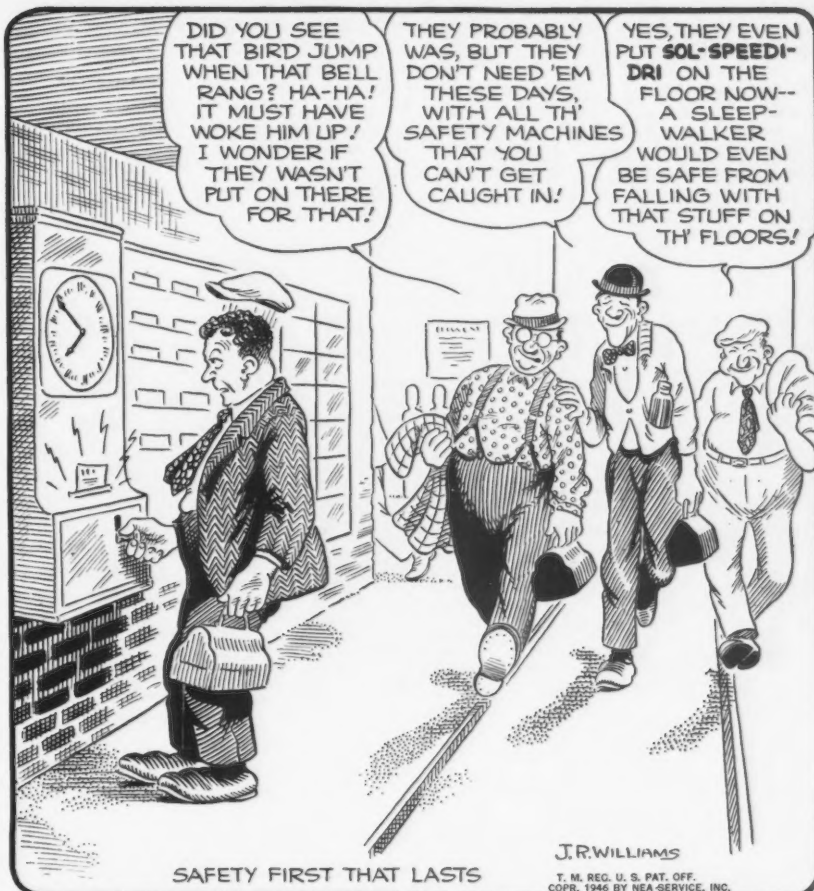
A trend towards the use of nickel, Monel, Inconel and other high nickel alloys for consumer products has become evident. Several producers already have resumed the manufacture of Monel kitchen sinks. Corrosion resistant and rustproof hot water storage tanks for gas and electric heaters also are again being made of Monel.

Inconel sheathing units for heating elements of electric kitchen ranges have returned to the market and more than a dozen manufacturers have standardized on the alloy for this purpose.

An important wartime development is precision casting in nickel, Monel, Inconel, and in the heat-treatable alloys such as "S" Monel. These castings make possible the production of intricate shapes and designs, especially in small sizes, without machining.

Still another use of the high nickel alloys is a new welding rod

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NEWS OF INDUSTRY

for the making of machinable welds in cast iron. Reports indicate that this rod can salvage annually many castings that otherwise would be scrapped.

Extruded shapes in the alloys not available prior to the war, are now being produced on a large scale. There is also an expansion in the use of nickel-clad, Monel clad, and Inconel-clad steel. Nickel-clad steel, among other applications, has begun to replace wood and steel cellar equipment and is being used in fermenting rooms and elsewhere in breweries. Beer cooler coils of pure nickel are on the market.

Weekly Gallup Polls

(CONTINUED FROM PAGE 121)

that if an election were held now, aside from who the candidates might be, the states would line up now in a presidential party vote about like this:

Would Go Republican 28 States
Would Go Democratic 20 States

The electoral division of the votes, on the same basis, would look like this:

Republican 317 Electoral Votes
Democratic 214 Electoral Votes

It takes 266 electoral votes to elect a President. This would give the Republican party a 51 electoral vote safety margin.

While the Republicans have an overall advantage, the way things line up today, it should be noted that 14 of the states now in the Republican column are there by margins of less than 55 pct. These add up to 138 electoral votes. By contrast, the Democrats have only seven states, with 73 electoral votes, by margins below 55 pct.

The way institute statisticians have estimated presidential party strength now is to take the vote for Congressmen as probably the best indication of present party strength and apply to the 1946 results the differentials that were registered in 1944.

Vote for Congress was taken as the base rather than vote for governor or senator because it is felt that vote for Congressman is less likely to be influenced by the popularity of individual candidates, especially in large states which contain a number of Congressional districts.

Hot Stretch-Reducing Of Seamless Pipe At National Tube Plant

Pittsburgh

••• The use of hot stretching for the reduction of both wall thicknesses and diameter in the final sizing operation in the manufacture of seamless steel pipe will be one of the innovations included in the National Tube Co.'s new continuous seamless pipe mill at Lorain, Ohio. Experimental work by a committee of National Tube Co.'s technologists and engineers established the feasibility of the application of this new principle. The hot stretching of the pipe in sizing not only permits substantial reductions in the wall thickness of the tube but also provides a means for making exceptionally heavy reductions in the diameter of the tube with a relatively small number of roll stands. This principle was discussed in a paper by Stevenson Findlater, before the Assn. of Iron and Steel Engineers at its convention in Cleveland, Oct. 1 to 4, 1946.

The operation involves the introduction of tension or hot stretching in the tube section by increasing the relative speeds of the rolls in successive stands to a greater degree than is necessary to compensate for the change in section area produced by the re-

WEIGHT LIFTING ACT: Walt Disney illustrates the relative weights of steel, aluminum and magnesium in a new film "Treasure from the Sea" released by the Dow Chemical Co. In technicolor, 16mm sound the production forecasts the many household and industrial uses of magnesium.

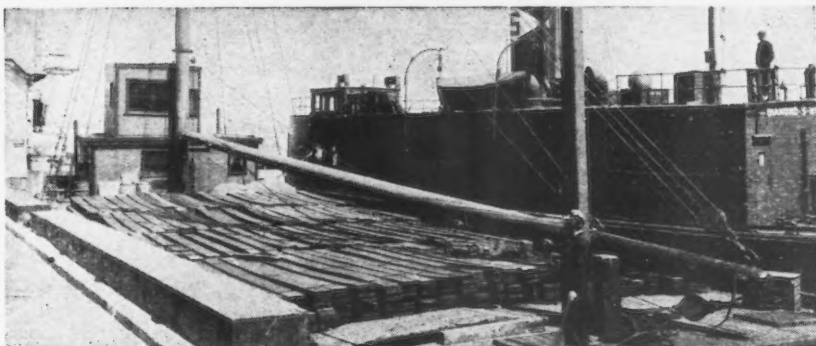


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Unretouched photograph of same steel, reloaded, after being processed with Tectyl

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- Tectyl is made in many specialized types; there's a Tectyl solution for every rust problem.

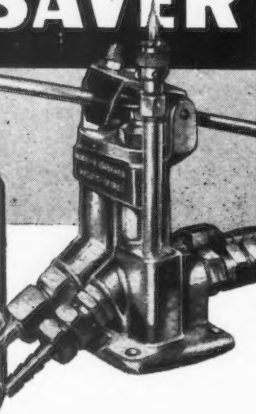
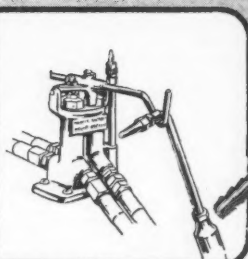
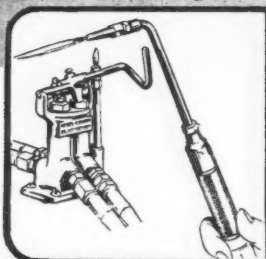
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duction in the several roll passes. The added speed differential between the rolls in successive stands stretches that portion of the tube between these stands.

The magnitude of this tension, which acts in the direction of the tube axis, is sufficient to elongate the tube section between successive stands, resulting in a reduction of section area. Thus, the rolling action and the tension together continuously thin the wall while the tube itself is being reduced in diameter.

No tension can be applied until at least two sets of rolls are working on the tube, and the entering portion of a tube being processed is not subjected to tension until the end of the tube is in the second stand of the mill. Consequently, a portion of the entering end of the tube, roughly equal to the center distance between the first and second stand, is subjected to compressive forces only, with the result that the wall thickness of this portion is increased before tension is applied.

Subsequent increments of the tube are subjected to tension immediately upon entering the first stand, the effect of which is to reduce the upsetting action of the rolls. This sequence is repeated as the front end of the tube progresses through additional stands, the wall of the extreme front end becoming heavier with each successive reduction.

Since elongation takes place between each roll pass, only a part of the entering heavy wall section is reduced before contact is made with the succeeding stand, and the balance of the original heavy end is therefore subjected to uniformly increasing amounts of tension as it is reduced and elongated in successive passes. The extreme front end of the finished tube is subjected to little or no tension; consequently, it has a relatively thick wall.

Subsequent increments, having been subjected to varying amounts of tension, will have walls of gradually decreasing thicknesses tapering back to a point where the full amount of tension developed by each stand in the entire mill has acted upon the tube, after which a stable condition is established. The same condition applies in reverse as the tube leaves the mill, so that all tubes that have

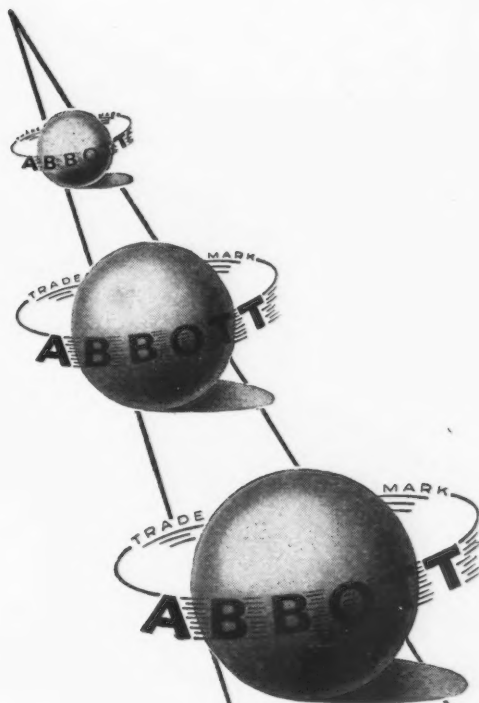
been stretch-reduced will have a heavy wall section on the front and back ends which must be discarded.

When sufficient tension is applied, the wall thickness reduction developed between the stands can be made to exceed the amount of thickening resulting from the compressive forces in the roll pass, thus permitting the production of finished tubes of lighter wall than the entering pierced shell. When wall thickness is reduced in this manner, large diameter reduction can be made in the roll stands without the usual tendency toward non-circular inside contour. In general, tubes with walls ranging from 0.120 to 0.25 in. can be processed with less difficulty than those having either lighter or heavier walls.

Conditions inherent in the process serve to limit the maximum size of tubing that can be efficiently stretch-reduced to about 3 in. OD. On the other hand, however, practically all of the factors controlling wall reduction favor the production of small diameter sections, making the process attractive for the manufacture of standard pipe $\frac{3}{8}$ to 2 in. in diam, with walls ranging in thickness from 0.08 to 0.2 in.

These data as well as others were established in a comprehensive development program inaugurated more than a year ago by the National Tube Co., when the exact nature and importance of the various items that characterize stretch reducing were first sought. A series of controlled rollings were conducted by the investigating committee on a 16-stand mill and on a smaller 8-stand sizing mill. Some 450 tubes of various diameters and walls were processed under a wide range of rolling conditions. Each tube was subsequently sectioned at 6 and 12 in. intervals throughout the entire length, and micrometer readings of the walls were taken at each section.

The novel feature of stretch reducing is its ability to reduce the diameter of the hot tube while simultaneously reducing its wall thickness without the use of a mandrel through the tube. The amount of wall reduction is principally controlled by the factors that determine the tension or pull applied to the tube by the roll

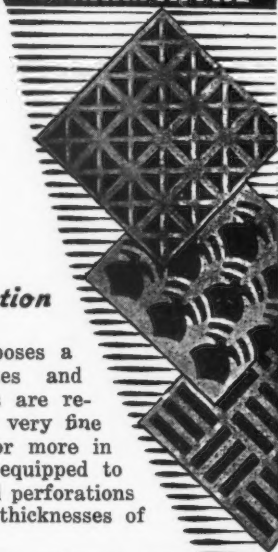
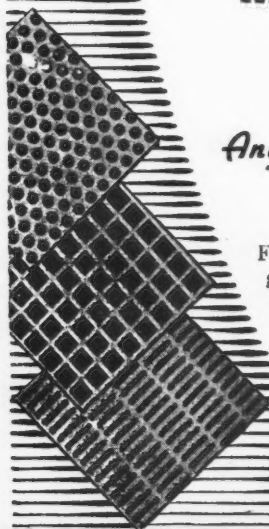


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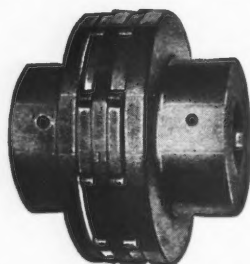
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NEWS OF INDUSTRY

stands. These factors include roll diameter, diameter reduction per roll stand, initial wall thickness of the tube, overall diameter reduction, and roll speed ratios.

Considerable flexibility is required in the selection of roll speeds. Different speed ratios between successive stands are required not only for each condition of diameter and wall reduction, but also for incremental adjustments in roll speeds that must be made to compensate for slip-page and similar indeterminate factors in the reducing process.

The simplest and most effective means of meeting this requirement is the use of individual motor drives for each stand. By means of variable voltage control, the delivery speed of the mill can be adjusted without affecting materially the relative speeds of the individual stands; yet the speed of any stand can be varied by the adjustment of the motor speed.

The amount of wall reduction produced under a specific set of mill conditions can be varied within limits by changing the relative speed ratios of the consecutive roll stands. Thus, finished tubes of a given diameter but of several wall thicknesses can be produced from the same entering shell sizes with no change in the mill setting except adjustments of the several drive motor speeds. With the hot stretching process, area reduction can be varied either by: (1) Changing the overall reduction in diameter of the tube through the addition or removal of roll stands; (2) by changing the amount of wall reduction through adjustment of roll speed ratios; or (3) by a combination of both.

The general improvements planned by National Tube Co. will give the Lorain plant still further advantages over existing facilities. In addition to the continuous seamless mill, there will be an entire new bessemer steel plant with three converters and auxiliary equipment; three new 59-oven byproduct coke batteries and auxiliary equipment including new coal handling equipment; one of the world's largest and most modern pipe warehouses; new blooming, bar and billet mills; and changes necessary to permit the concentration at Lorain of all the company's butt-weld and galvanizing facilities.

Czech Metalworking Industries Expected To Show Large Losses

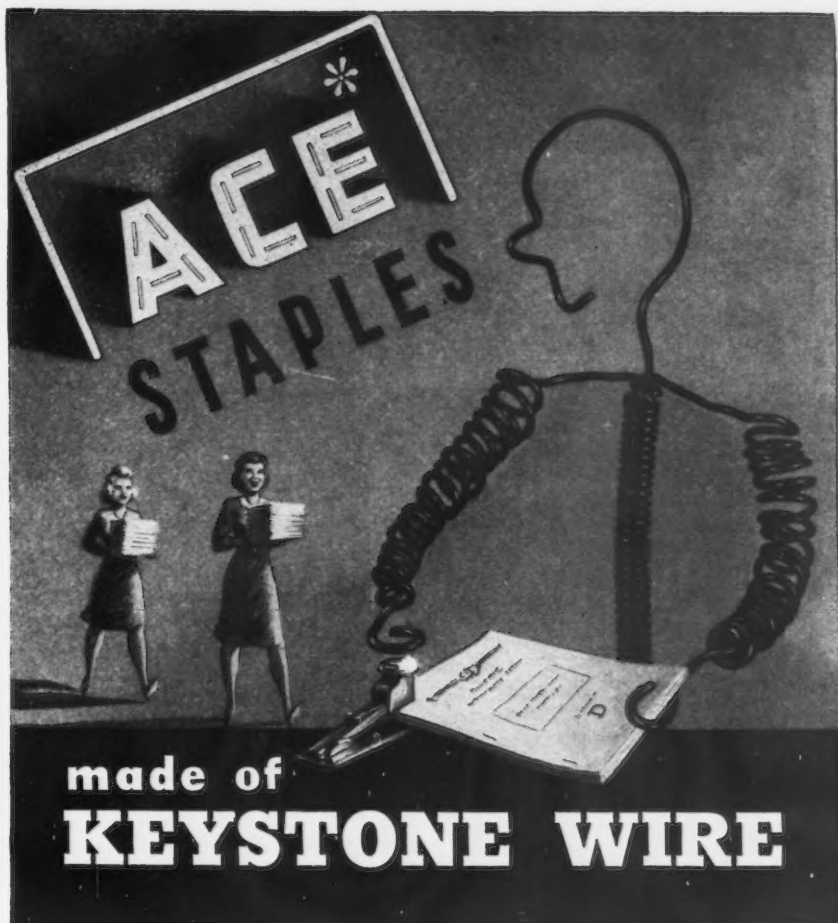
London

... A survey at the end of the first year following the Czechoslovakian Government's nationalization laws, reported by the Czechoslovak Economic Bulletin, issued by the Ministry of Foreign Trade, indicates that the metalworking and machinery industries will show heavy losses. On the credit side, the Czech paper, woodworking, textiles and leather and rubber industries will show a profit for their first year of nationalization. To date 19.3 pct of the total number of industrial concerns in the country have been nationalized, but those 2200 firms affected employ 61 pct of all the country's industrial manpower.

Managing boards have recently been appointed for a number of the nationalized enterprises, thus completing their organizational structure. Confiscated industrial property is being assigned to the nationalized groups on a legislative basis under the Ministry of Industry.

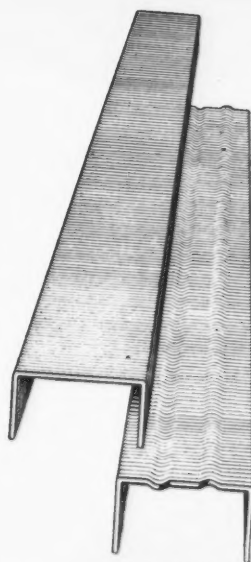
The present financial state of the national corporations arose from the conditions in which Czechoslovakian industry had found itself immediately following the war. The conversion of factories for war production had involved considerable capital expenses which were of no value after the war, but left the firms heavily involved financially. During the war the leading positions in industrial concerns had been filled almost entirely by Germans, who had used their positions for deliberate plunder. Hidden reserves of supplies had thus been exhausted and used for producing faked balance sheets to justify the payment of dividends, so that many businesses were left with concealed losses. Many factories have also suffered serious war damage.

Germany had left the industry with a large number of bad debts, while the suppliers of the various factories were pressing for payment of their accounts. Some concerns had not paid interest or amortization charges on their obligations during the war, and would now have to make supplementary payments thereon. The



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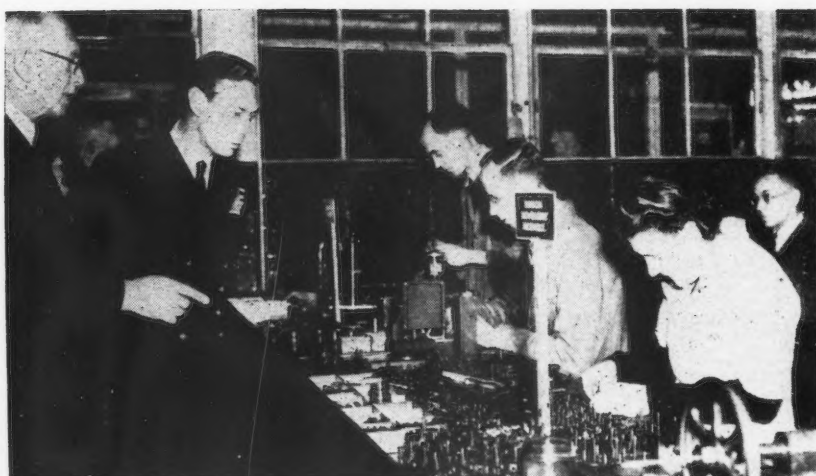
This is another example of the versatility of Keystone's research and development facilities. Whatever the wire need, Keystone can normally supply it.

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ROYAL INSPECTOR: King George VI of England visits the Imperial typewriter factory at Leicester, England. The King is inspecting the ribbon movement assembly department.

slacking-off of working discipline during the first months following the liberation had also had an unfavorable effect.

Nationalization has found some of the industries in a very serious financial position. In the metal-

working industry alone the bombing of the largest factories (Zbrojovka Brno, Skoda Works, C-K-D, and Prvni Brnenska Strojirna) had involved damage to the value of \$138,600,000, while claims for German bad debts equaled that

amount. In the Skoda works \$1,980,000 had been paid in wages alone for clearing away ruins and damage up to the end of 1945.

In changing over to peace production the various concerns had found themselves temporarily without a considerable proportion of their production program, and had had to pay wages in no way corresponding to output. Rather than discharge their employees they used them for other work without regard to profit. The enormous deficit which had thus been produced between receipts and expenditure amounted to \$73,270,000 in the nationalized metalworking industry. With various modifications the same applied to the mining, foundry and power industries. The Minister of Industry emphasized that even if Czechoslovakia had not nationalized industry, it would have been faced with the same financial problems with industry in private hands.

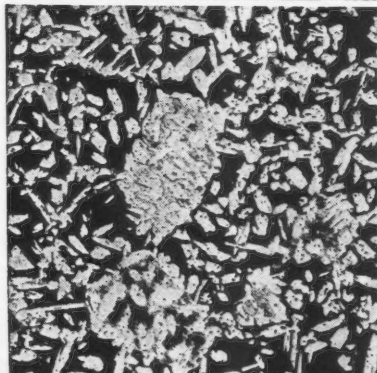
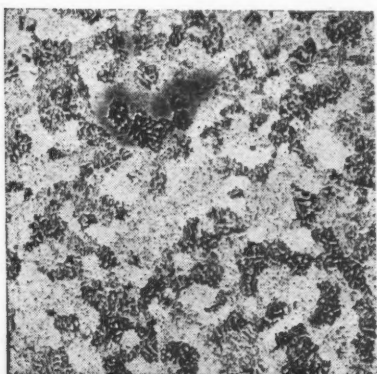
For the requirements of the 2-yr plan, nationalized industry has worked out a balance sheet for Jan. 1, 1947, which is estimated as follows:

	(in million dollars)	
	Assets	Liabilities
Mining industry	\$233	\$177
Power industry	170	82
Foundry industry	193	183
Metalworking industry	464	406
Chemical industry	155	68
Ceramic industry	44	26
Glass industry	22	12
Paper industry	35	17
Woodworking industry	25	18
Textile industry	137	65
Leatherworking industry	66	28
	\$1,544	\$1,076

The heavy indebtedness of the national enterprises had arisen before they had actually been set up, and the national enterprises themselves were not actually responsible for it. They could not, however, face the interest and amortization charges on these debts without working at a loss. Accordingly, the Ministry of Industry will shortly prepare a solution of these questions which will prove satisfactory alike to the national enterprise, the state and their creditors.

Most of the various branches of nationalized industry are already showing profit-making tendencies. This applies particularly to the chemical, leatherworking and rubberworking, papermaking, textile, glass and woodworking industries. Ceramics also show signs of becoming a profitmaking concern.

An appropriate survey of the current results of the nationalized



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NEWS OF INDUSTRY

branches of industry for the current year is as follows:

Mines	Deficit	\$21,400,000
Power	Deficit	1,000,000
Foundries	Deficit	17,700,000
Chemicals	Profit	7,900,000
Glass	Profit	1,900,000
Ceramics	Deficit	39,000
Paper	Profit	1,600,000
Woodworking	Profit	600,000
Textiles	Profit	5,600,000
Leather and rubber...	Profit	8,400,000

The metalworking and machinery industry will show heavy losses. For example, the following losses are envisaged for the national enterprises named: Skoda Works, about \$5,200,000; Ceskomoravska-Kolben-Danek, about \$1,000,000; Krizik Electro-Technical Works, about \$140,000; United Brno Casting Shops, \$1,600,000; Kowolis-Caslav, about \$200,000; while further losses are also expected for Brnonska zbrojovska and Letecke zavody.

The Skoda Works, however, hope to even up their accounts during 1947, while a profit is expected in a number of national enterprises in the metalworking and machinery industries, such as the Ceramic Equipment Factory at Blansko (\$200,000); the Chotebor Metalworking Factory (\$80,000); Bateria at Slany (\$100,000); Kohi-Noor at Prague (\$300,000); Transporta of Chrudim (\$50,000); and the First Brno and Kralovo Pole Machinery Works at Brno (\$100,000).

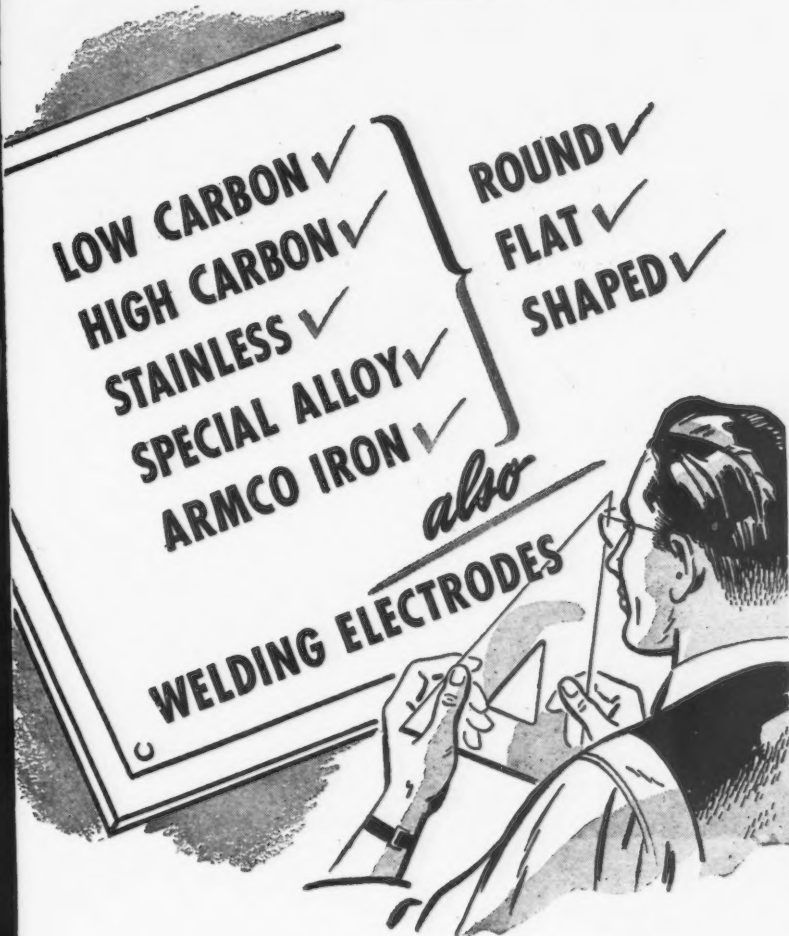
Another concern expecting to show a profit is Agrostroy, which will shortly proceed for the second time to lower the prices of agricultural machinery. Most of the national enterprises are showing a steady improvement in current results every quarter.

According to a Czech expert, estimated industrial production has already reached 70 pct of the 1937 level, i.e. of the best prewar year. The greatest success scored has been solving the problem of replacing German workers in industry. Between August 1945, and August 1946, the number of Germans employed in industry decreased by 100,000, and the total number of persons employed in industry increased by 50,000.

This means that during the year 150,000 Czech and Slovak workers had voluntarily taken up employment in industry. As regards efficiency, it might be said that a year ago the average output per head was 50 pct to 60 pct of the prewar level, whereas now it averages about 80 pct of the prewar level.

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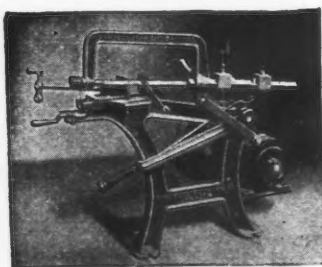
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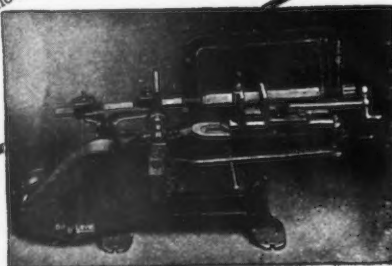
MARVELSAWS

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NEWS OF INDUSTRY

Transfer of British Coal Mines Due Jan. 1

London

... Britain's Minister of Fuel and Power, Emanuel Shinwell, has announced in the House of Commons that the primary vesting date for the transfer of the coal mines to national ownership would be Jan. 1, 1947.

Mr. Shinwell said that the National Coal Board had been working hard in preparing to take over the mines at the earliest possible moment. Administrative problems involved were formidable, and it would be some time before finality was reached in the case of many assets for which options had to be exercised. The board had to make arrangements to continue conciliation machinery and wage agreements in the industry and provide for adequate financial arrangements and control. Until its organization was fully staffed many provisional arrangements would have to be made, and composite undertakings would present special difficulties.

He declared that, "In spite of the problems with which the board is faced, there is, I am sure, general recognition in the industry, which I may say the board shares, that the mines should be vested in the board at the earliest possible date."

Deputy Administrator For WAA's Property Disposal to Resign

Washington

... Resignation of John J. O'Brien as WAA Deputy Administrator for Real Property Disposal has been announced here. He will be succeeded at WAA by Harry E. Pollock, the present chairman of the Real Property Review Board.

Mr. O'Brien, a former Brigadier General in the Army, will remain on the job until Dec. 31 when he will assume the vice-presidency of Leo J. Sheridan, Inc., real estate operators. He supervised and directed all acquisition, leasing and disposal of real estate for the Army since the beginning of the emergency, going to WAA in March 1946 to take over real property disposals for that agency.